



Changing Minds and Machines:

A Case Study of Human Rights Advocacy in the Internet Engineering Task Force (IETF)

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Hillary 2021

Thesis submitted in partial fulfilment of the requirements for the degree of DPhil in Information, Communication, and the Social Sciences in the Oxford Internet Institute at the University of Oxford

Word count: 82.201

ABSTRACT

Below the visible aspects of social media and other Internet applications lies a vast infrastructure, where opaque organisations and unaccountable technologists exercise significant power over the Internet. This dissertation is a first-hand anthropological study of how the culture of one such organisation, the Internet Engineering Task Force (IETF), plays into its infrastructural politics thereby shaping the development of technology across the Internet. I propose a framework for *Critical Internet Governance* that moves beyond consideration of the role of states and corporations, to focus on the cultural forces shaping Internet governance and which groups have the power to define it.

My dissertation asks: What role does IETF culture play in its infrastructural politics? To answer this question, I conducted an ethnographic case study of human rights advocates working in the IETF. My findings draw on three years of ethnographic fieldwork (2017–2020), archival work, and 65 interviews. I focus on three interrelated aspects of the IETF: its organisational culture, its exclusionary working practices and how they affect the reception of human rights values, and how the IETF's imaginaries shape engineers' understanding of responsibility for the technology 'they choose to create'.

My research demonstrates how the organisation's protocol politics and network imaginaries negatively affect the advocates' ability to apply human rights norms to technology development. Displaying what I call 'engineered innocence', IETF technologists primarily intervene in public interest matters when their culturally particular political commitments are threatened. The IETF's rejection of political questions related to human rights emerges from the cultural values of liberty and autonomy valued by its technologists. My dissertation documents the cultural specificity of Internet standardisation to challenge current theorising in Internet governance that postulates a 'turn to the infrastructure' and dismisses human rights' efforts without cultural analysis.

This dissertation supports the development of theoretical and policy frameworks that define corporate responsibility in digitally distributed systems and hold Internet governance organisations, and their participants, accountable for the power they exercise.

*To Felix Paul Luíz Speth,
may you be curious enough to pursue a DPhil and smart enough to know better*

Most of the harms that technology can cause can't be contained by the technology. It's like trying to stop gun violence through gun design—it's valuable, but neither the source of nor the solution to the problem.

—Sean McDonald on Technology Theatre, July 2020

Listening carefully to what purveyors of a given technology say can tell you a lot about how a technology fits into, works with, or challenges the world around us.

—Anna Lauren Hoffmann on a Decade of Breaking Things, June 2014

ACK-nnowledgements

To create a reliable connection, the Transmission Control Protocol (TCP) must establish a three-way handshake. It goes like this: SYN, SYN-ACK, and ACK. It is no coincidence that both DPhil dissertations and network conversations begin with such ACK-nnowledgements. I count myself lucky that my list of people to thank is longer than the protocol for establishing network connections.

I would like to thank the faculty of the Oxford Internet Institute (OII), this multi-disciplinary department has been my intellectual home since I started my master's programme in 2014. I would like to express my gratitude to the professors and students with whom I collaborated, as well as the teaching, research and organising opportunities my time there presented. Many OII academics played a crucial role in my dissertation, starting with my wonderful and esteemed supervisors: Professor Victoria Nash and Professor Gina Neff. They provided critical notes and crucial encouragement in equal measure, as well as dinners during the occasional, but deeply cherished, rotating formal halls across Oxford's colleges. I would like to express my gratitude to Professor Luciano Floridi, who played a crucial role in my DPhil trajectory from being my MSc supervisor to helping me secure a place as a doctoral student in the inaugural cohort of the Alan Turing Institute for Data Science and AI, *grazie mille*.

I must thank Professor Rosaria Taddeo for her encouragement and Professor Joss Wright for teaching me how to teach and helping my work progress over the years. I appreciate all the support I received from the OII's administrative staff, especially Laura Maynard and Duncan Passey who kept Oxford's bureaucracy at bay. In my broader academic circles, I am very glad to have gotten to know Alix Dunn, Andrew Schrock, Andrew Selbst, Ashwin Mathew, Becca Lewis, Britt Paris, Cami Rincón, Farzaneh Badiei, Gabriella Coleman, Gerdien Steenbeek, Hans de Zwart¹, Jan Aart Scholte, Janet Haven, Joan Donovan, Joris van Hoboken, Kira Allmann, Laura DeNardis, Lawrence Lessig, Leonie Tanczer, Linette Taylor, Lisa Vermeer, Mario Fumerton, MC Elish, Mark Graham, Meredith Whittaker, Michael Veale, Milton Mueller, Os Keyes, Paul Dourish, Peaks Krafft, Roel Dobbe, Robert Gorwa, Ryan Calo, Sandra Braman, Sarah Myers-West, Seda Gürses, and Stefania Milan who have each provided me with invaluable advice and mentorship.

This research would not have been possible without my funders. I want to extend my thanks to the Alan Turing Institute for providing me with a full scholarship. It is hard to believe that, for a brief moment, my office was the British Library where I had access to original Turing machines and a coffee dispenser run on an Ipad. I am also very grateful for the funding I received from the Ford Foundation (no. 136179, 2020) which saw me achieve my research and policy goals in the last year of my DPhil. I am especially indebted to Michael Brenman, Lori McGlinchey, and Jenny Toomey for believing in my vision of public interest technology work. I would like to thank Exeter College for the financial support of my fieldwork and for providing a second home in Oxford.

¹ From privacy penguin to PhD.

I would not have been able to undertake a multi-year project like a DPhil, researching and writing in languages (both English and internetworking) that were not my native tongue, if I hadn't been supported and raised by a family of adventurers and structural over-achievers: the De Beauf Clan and the Cathen Cabal. My first acknowledgement goes to my friend, turned-roommate, turned-“date”, turned-partner, turned-husband, turned baby-dad: Marijn Speth-Cath. This DPhil would not have been possible without your *rotsvast* support, encouragement, Spething and silliness. To our baby Felix, thank you for showing me what my priorities are and that certain deadlines cannot be moved. I will always be amazed by my Prof-Emeritus mom Inez De Beaufort for being proud and supportive while also consistently reminding me that ‘Academia is not (the only) way’. To my aspiring dr.-to-be brother Kees who was always there with tweets, food, and his janky car, I would like to say: it's not too late to quit now and to my sister Ernestine, thank you for the homemade memes and reminding me that DPhil students, like plants, ‘have to solve their problems where they are’. To my dearly departed dad: ‘Nee, heb je...’

Many thanks to cousin Lily for keeping all my secrets secret, even the fake ones, cousin Sanne for never thinking it is too late (or too early) for a coffee run. Cousin Ina for showing me how to love London. I deeply appreciate my cousins Ina, Luke, Cukel, Wendy, Nienke B, brother-in-law Daan Speth, uncles and aunts AJ, Carine, Danielle, and Albert for sharing their doctoral horror stories. Aunt Pauline, you provided much needed moral (and financial) support as well as digital-detox weekends. Aunt Sietske thank you for showing me the other side of Florida. Mother-in-law Agnes for welcoming me into the family. Oom Bram, thank you for the ‘grounding’ edits. Luis Felipe, you left to soon.. I will always remember to ‘imagine-se’ (Tamo Junto, Irmão). Last but not least, I want to express my gratitude to my grandfather Kees Cath for always encouraging me to venture out and my grandmother Corinne De Beaufort, who taught me how to tell a good story but sadly passed away just before this one was done.

One of the unexpected joys of doing a DPhil is being part of a solid cohort of junior researchers and I got very lucky in that department. Rarely have I met a group of individuals who are as smart as they are supportive, as lively as they are committed to seeking social change through their research. My DPhil cohort made as much time for coffee, quizzes, and pub nights as they did for burning the midnight oil to provide last-minute feedback on each other's ‘garbage drafts’. I am excited for what all these amazing individuals will do next and look forward to a lifetime of professional companionship and pub-hopping. There are multiple people who deserve special thanks. Beginning, of course, with Kate Sim, my OII ‘Ride or Die’: without your support, ‘twinning’ and travelling this DPhil would not have gotten done. Amelia (Mia) Hassoun, I owe you at least 1000 squats and a lifetime of Vermouth. Paige Mustain, you are the best cheerleader, friend and mentor I could have hoped for. Nam Marchal, for keeping the tea hot and the fashion haute, Joe Shaw, 5, 147, 999.. thank you for keeping me accountable in the last stretches, Ben Zevenbergen, for beating me to it (but only by a small margin). My favourite academic bands ‘Club Death Drive’ and its colourful bandmates: Kate, Erin Simpson, Yung Au and Cindy Ma as well as ‘The Buff Titties’: Kate, Mia, and Nam, thank you for calming my... Siân Brooke for

the great viva and veggie advice. Thank you to everyone in the 2016 cohort, especially Sam Bradshaw and Party Paddy.

Oxford would not have been the same without my wonderful housemates Sarah-Beth Amos and Cian Ó Concubhair, who introduced me to the concept of ‘dessert toast’ and ‘hot toddies’, life has never been the same. To all my friends and teachers at Angoleiro do Mar capoeira (HéYa) and Oxford forro, reminding me to keep moving forward. To my therapist Gaby and my students, thank you for putting up with me.

Surprisingly, I managed to maintain a life outside of Oxford and friendships that kept me grounded throughout this DPhil. First and foremost, Niels ten Oever my former boss, fellow DPhil travel, master of ceremonies, DPhil paranymph and general bestie: I look forward to our next decade. Kate Sim (yes, because some friends deserve praise twice), we need to ‘do less’. Mehwish Ansari for putting up with me at Kleinfeld’s and other odd places. Vidushi Marda for all the conversations especially those with song and chai. Fieke Jansen for sharing in Dutch diplomacy. Os Keyes for being the puniest person in my life. Nani and Andreas Jansen Reventlow for the cocktails and culture. Suzanne van Geuns for the Christmas quizzes, side projects and edits. Matt Mahmoudi for the squirrels, screams and signal notifications. Nienke Venema, Quinn McKew and Frederike Kaltheuner for keeping me accountable to the real world. Merel da Lua for getting me in, and out, of trouble. Shannon and Kedar Bell for the many margaritas. Saim Saeed for beer and bikes in Brussels. Natasha Natarajan for the creative side-projects and support. Evan and Carly Olenick for keeping me alive (and fed) while in D.C. The Creatures for being a second family, Mallory Knodel for the Internet cats. Jenny Orlando for reminding me to ‘use my time’. Andrew Strait for the many breakkies. The Zugs for the (Cinnabon) fun. Gurshabad Grover and Shivan Kaul Sahib for never being too busy to answer my basic questions. Thank you to all the people who sent me (silly) post cards in the final stretch, the snail-mail made all the difference.

I am grateful for being part of the Public Interest Technology Group (PIT-G) and getting to know: Amelia Andersdotter, Alissa Cooper, Andrew Sullivan, Avri Doria, Beatrice Martini, dkg, Ekr, Joe Hall, Juliana Guerra, Konstantinos Komaitis, Marco Hogewoning, Mark Nottingham, Martin Thomson, Melinda Shore, Nick Doty, Paul Wouters, Rich Salz, Stéphane Bortzmeyer, Ted Lemon, and Ulrike Uhlig.

Last but certainly not least, I would like to thank all the participants in the study.

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Abbreviations

AAAS: American Association for the Advancement of Science

ACLU: American Civil Liberties Union

AI: Artificial Intelligence

AoIR: Association of Internet Researchers

APC: Association for Progressive Communications

ARPA: Advanced Research Projects Agency

ARPANET: Advanced Research Projects Agency Network

BOF: Birds of a Feather

CAT: Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment

CDN: Content Delivery Network

CDT: Centre for Democracy and Technology

CEDAW: Convention on the Elimination of All Forms of Discrimination against Women

CERN: European Organisation for Nuclear Research

CPRS: Computer Professionals for Social Responsibility

CRC: Convention on the Rights of the Child

CRPD: Convention on the Rights of Persons with Disabilities

CSR: Corporate Social Responsibility

CTO: Chief Technology Officer

DARPA: Defence Advanced Research Projects Agency

DHCP: Dynamic Host Configuration Protocol

DNS: Domain Name System

DOD: Department of Defence

DOH: DNS over Transport Secure

DPhil: Doctor of Philosophy

EFF: Electronic Frontier Foundation

EPIC: Electronic Privacy Information Centre

FOSS: Free and Open-Source Software

HBO: Home Box Office

HRC: Human Rights Council

HRPC: Human Rights Protocol Considerations

HRPC-RG: Human Rights Protocol Considerations Research Group

HTML: Hypertext Markup Language

HTTP: Hypertext Transfer Protocol

HTTPS: Hypertext Transfer Protocol Secure

IAB: Internet Architecture Board

IANA: Internet Assigned Numbers Authority

IBM: International Business Machines Corporation

ICANN: Internet Corporation of Assigned Names and Numbers

ICCPR: International Covenant on Civil and Political Rights
ICERD: International Convention on the Elimination of All Forms of Racial Discrimination
ICESCR: International Covenant on Economic, Social and Cultural Rights
ICPPED: International Convention for the Protection of All Persons from Enforced Disappearance
ICRMW: Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families
ICT: Information and Communication Technologies
I-D: Internet Draft
IEEE: Institute of Electrical and Electronics Engineers
IETF: Internet Engineering Task Force
IGF: Internet Governance Forum
IMO: In My Opinion
IMHO: In My Humble Opinion
IP: Internet Protocol
IPTO: Information Processing Technology Office
IPv6: Internet Protocol version 6
IRTF: Internet Research Task Force
ISOC: Internet Society
ISP: Internet Service Provider
ITU: International Telecommunications Union
LLC: Limited Liability Company
MIT: Massachusetts Institute of Technology
NAP: National Action Plan
NCP: Network Control Program
NGO: Non-Governmental Organisation
NPL: National Physical Laboratory
NSA: National Security Agency
NSF: National Science Foundation
NSFNET: National Science Foundation Network
NWG: Network Working Group
OHCHR: Office of the United Nations High Commissioner for Human Rights
OII: Oxford Internet Institute
OSI: Open Systems Interconnection
PM: Pervasive Monitoring
QUIC: Quick User Datagram Protocol Internet Connections
RDAP: Registration Data Access Protocol
RFC: Request for Comments
RG: Research Group
RIPE: Réseaux IP Européens
SAAG: Security Area Open Meeting

SEP: Somebody Else's Problem
SNI: Server Name Indicator
STS: Science and Technology Studies
TCP: Transmission Control Protocol
TLD: Top-Level Domain
TLS: Transport Layer Secure
TLS-PDW: Secure Password Ciphersuites for Transport Layer Security
UCLA: University of California Los Angeles
UDHR: Universal Declaration of Human Rights
UK: United Kingdom
UN: United Nations
URL: Uniform Resource Locator
US: United States
USSR: Union of Soviet Socialist Republics
VP: Vice President
WCIT: World Conference on International Telecommunications
Web-RTC: Web-Real Time Communication
WGIG: Working Group on Internet Governance
WWW: World Wide Web
W3C: The World Wide Web Consortium

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1. Introduction: 'Lo' and Behold

1.1 Introduction

The first message ever sent using the revolutionary packet-switching technology that underpins the modern Internet was brief. It simply said ‘Lo’. This first message already contained the combined engineering, academic, and social efforts that continue to drive the Internet today. In October 1969, Professor Leonard Kleinrock, who developed the mathematical theory supporting packet switching, attempted to send a first message over a network of computers. This network was called the Advanced Research Projects Agency Network (ARPANET) and it was solely available to a select group of academics, government officials, and industry professionals. The technology that made ARPANET work forms the base of the modern Internet and its much wider reach.¹

The ARPANET was the first wide-area packet-switching network and it ran on the forerunners of what would become key Internet protocols: Transmission Control Protocol (TCP) and Internet Protocol (IP). These Internet protocols continue to play a crucial role in the Internet’s existence, as they allow diverse networks and products to exchange information. ARPANET used packet switching rather than the circuit switching technology common to telephony. The revolutionary advantages of packet switching were manifold. Instead of requiring a dedicated connection, packet-switched networks used protocols to break data into small units before dispersing them across the network to be reassembled by its recipient. This meant that the packets chose the most efficient routes to their destination, minimising congestion and allowing users to share bandwidth.

But the early Internet did not work flawlessly. Kleinrock and his students had been unable to write the full word they had intended to send: ‘Login’. Kleinrock later wrote the following about their failed attempt:

When my team of graduate students and I sent the first message over the Internet on a warm Los Angeles evening in October 1969, little did we suspect that we were at the start of a worldwide revolution. After we typed the first two letters from our computer room at the University of California Los Angeles (UCLA), namely, “Lo” for “Login,” the network crashed. Hence, the first Internet message was “Lo” as in “Lo and behold”—inadvertently, we had delivered a message that was succinct, powerful, and prophetic.²

¹ Some monarchs were allowed to use the system, including Queen Elizabeth II (Braman 2012, 38).

² For further details, see Kleinrock, Leonard. 2019. ‘Fifty Years of the Internet’. *TechCrunch* (blog). 2019. <https://web.archive.org/web/20210119191317/https://techcrunch.com/2019/03/18/fifty-years-of-the-internet/>

The technology behind this message certainly is one to ‘lo and behold’. Internet protocols continue to play a crucial and sustained role more than 50 years after this first communication.

Some academics consider the development of the Internet comparable to the discovery of heliocentrism (Floridi 2010, 8) or the Industrial Revolution (Benkler 2006). While these descriptions might be hyperbolic, it is hard to imagine a world where work, education, healthcare, and interaction with governments are not wired (Braman 2012; DeNardis 2020; Neff et al. 2015). The Internet does not just connect people. Increasingly, the network joins devices together, leaving person-to-person communication behind (DeNardis 2020). This means that electricity grids, water management facilities, agriculture, cities, and mundane household items like refrigerators and toothbrushes now depend on the technologies that failed to transmit the word ‘Login’, halfway through the last century.

The Internet increasingly structures our lives, but who structures the Internet? The growing importance of the Internet grants what Ben Green calls a ‘subtle but potent power to those who design and deploy that technology; we must be critical about the values embedded in these tools and who gets to choose them’ (2019c, 18–19). My understanding of this ‘subtle power’ draws from the work of anthropologist Christopher Kelty, who studies the cultural significance of free software. Following Kelty, I consider power as not just located within the designers’ shared moral and technological order of the Internet but also in their ability to shape its infrastructure such that it enacts that order (2008, 28). The technologies the Internet designers build mediate democracy, rights and access to information (Cohen 2019; DeNardis 2009, 2011, 2014, 2020; Donovan 2019; Gillespie et al. 2020; Milan 2013; Wright 2012). My work examines the power that Internet protocol designers exert over and through the infrastructure of this pervasive technological network.

Much of the current literature in social science focuses on power in the context of the most visible aspects of the Internet, primarily its consumer-facing services and applications like social media platforms (Donovan and boyd 2021; Gillespie 2018; Gillespie et al. 2020; Gorwa 2019; Lewis 2019; Nash et al. 2017; Noble 2018; Suzor et al. 2019). Yet, for those services to function, a range of individuals and organisations need to build the Internet infrastructure to support it, from physical hardware to protocol design. These infrastructure companies and their designers make crucial decisions and value judgments about the Internet’s functioning that can have implications for fundamental rights. Increasingly, these designers also include public interest technologists and other individuals representing civil society organisations with human rights or social justice mandates.

These advocates have recognised the power of Internet infrastructure design, including protocols, which motivates their choice to work alongside engineers in the open Internet governance bodies that bring together key Internet infrastructure companies in a relatively accessible format.

My research will focus on the efforts of one such group of civil society representatives working with, and sometimes against, the designers of Internet protocols in its main governance body: the Internet Engineering Task Force (IETF). This dissertation follows the terminology set out by DeNardis by using the terms protocol and standard interchangeably (2009, 6). In this dissertation, the IETF—and particularly, its participants’ reaction to the inclusion of human rights values in Internet standardisation—is a proxy for infrastructural politics at large. By politics, I refer to the historically contingent cultural relations of power and arrangements of authority in technology (DeNardis 2009; Winner 1980). The IETF brings together many the most prominent Internet infrastructure companies, including those working on hardware, software, and popular social media applications. My dissertation uses an ethnographic case study of human rights advocacy to provide novel insights into the politics that drive the IETF and its prominent participants, from the inside out.

This introduction chapter outlines the structure and background of my dissertation. I discuss the main interventions of my research into academic debates about IETF culture, human rights advocacy in Internet governance, and infrastructural politics, which I address through my ethnographic approach. First, I introduce my case study of *Human Rights Advocacy* in the IETF and outline my *Research Questions and Significance*. Subsequently, I briefly introduce the *Internet Engineering Task Force (IETF)*, the standard-setting governance body in which I undertook my fieldwork. Then I present a critical introduction to *IETF Culture* that reveals what it excludes and how its cultural contours powerfully affect Internet infrastructure decisions. I give descriptive depth to the *Power of Protocols* by introducing how their cultural influence matters, focusing on how designers exercise power through Internet infrastructure. Then, I briefly outline the implications of my research for *Infrastructural Politics* writ large, detailing the interventions my dissertation makes. Finally, I offer the *Theoretical and Policy Implications* of my research, concluding with an *Outline* of my dissertation in its entirety.

1.2 The Internet Engineering Task Force (IETF)

This dissertation analyses the recent entry of human rights advocates into the Internet Engineering Task Force (IETF) and explains the importance of these efforts for understanding infrastructural politics as they play out in practice. I provide the first ethnographic exploration of these human rights efforts and the various forms of cultural resistance and cooperation its advocates encountered. Critically examining how the cultural dimensions of standardisation shape, and complicate, the work of human rights advocates, provides a new vantage point from which to theorise the infrastructural politics of the Internet. Ultimately, my focus on cultural dynamics in the IETF illuminates ethnographically *how* values make their way into Internet infrastructure, *whose* priorities are advantaged through its governance, *which* role the IETF plays in that process, and *what* human rights advocates can do to exert influence.

This investigation is framed by my definition of Internet infrastructure and infrastructure companies, as well as by my understanding of how the IETF, and the Internet protocols it designs, perform within that infrastructure. In this dissertation, Internet infrastructure encapsulates aspects of the Internet that are ‘reliable, transparent, widely shared and visible to users when it breaks down’ (Plantin et al. 2018, 7). This definition does not limit Internet infrastructure to a set number of technologies. Rather, this expansive approach allows me to include the ‘emergent essential’ (Sandvig 2013, 6) of the pipes, protocols, and politics that make the Internet work, from hardware to webhosting. This flexible definition, focused on functionality, captures the constantly evolving nature of the Internet (Gillespie et al. 2020; Plantin et al. 2018; Plantin and Punathambekar 2019; Sandvig 2013). It also allows me to include a range of people, from engineers and designers to activists pushing for the inclusion of human rights considerations in standards, as part of Internet infrastructure.

Multiple Internet governance organisations develop and maintain Internet infrastructure, including the IETF. The IETF is a private, industry-led Internet standardisation body. Founded in 1986, the IETF is one of the oldest standard-setting bodies and it evolved directly out of the ARPANET. It was founded to develop the Internet standards that enable the exchange of information on the Internet by connecting different infrastructural products and services to one another. The need for such standards arose organically to ensure that heterogeneous networks could interact. IETF’s governance is characterised by the absence of top-down management and technology development based on voluntary coordination between technical actors. Some of the biggest global Internet

hardware and software companies, including Apple, Cisco, Cloudflare, Facebook, Google, and Huawei, participate in the IETF. I call these companies Internet infrastructure companies due to their role in making the technologies that power the Internet but also because of their part in shaping—through their participation in the IETF and other public-private bodies—the political rules that govern Internet infrastructure.

The internal functioning of these infrastructural companies is often opaque and difficult to access for researchers. This means it is difficult to know what drives their decisions, which influence billions of Internet users. Furthermore, policymakers and public interest defenders do not tend to demand strong transparency and accountability commitments from infrastructure companies, or even from those departments in social media and platform companies doing infrastructural work (think for instance of Amazon’s provision of cloud computing infrastructure or Google’s role in developing transport standards). This means that the work of infrastructure companies remains without much needed scrutiny, considering its importance for Internet users.

My dissertation presents a novel way to develop such scrutiny and access, by demonstrating that some of the politics of private infrastructure companies can be made visible by ethnographically studying their actions in open governance organisations. The participation of these Internet infrastructure companies, in comparatively open standard-setting bodies like the IETF, provides an important window into how their functioning, politics, and technologies direct the future of the Internet. During the IETF’s meetings three times a year, engineers from these infrastructure companies come together with their colleagues from academia, government, and civil society to discuss and design standards that ensure the Internet’s interoperability, connectivity, and security.³ These standards reflect both the collective and the individual needs of these infrastructure companies, as well as their response to calls from civil society to consider rights and other social concerns, in clear view.

The IETF’s informal culture and relatively open governance structure meant I had broad access to the Chief Technology Officers (CTO) of popular browsers, the Heads of Research in the leading companies developing Content Delivery Networks (CDN), and the Vice Presidents (VPs) of Standards at major hardware companies. As such, I was able to directly follow contentious

³ The paradox of the need for face-to-face meetings to facilitate Internet connectivity was not lost on me, or on IETF participants. In an RFC describing the IETF’s history, a senior figure states, ‘We also instantly felt the irony. This new network was supposed to make it possible to work together at a distance, and the first thing we did was schedule a significant amount of travel’ (RFC 8700).

discussions between these individuals and the human rights advocates at the heart of my work as they arose. The duration of my research (2016–2020), which included three years of fieldwork (2017–2020) in the IETF both online and offline, allowed me to cultivate lasting relationships with leading Internet infrastructure architects and human rights advocates. Spending time alongside these individuals generates novel theoretical insights into the cultural constitution of Internet infrastructure, that are missing from current academic and policy debates.

The IETF sits at a uniquely rich intersection of Internet governance culture, human rights advocacy in standards-setting, and infrastructural politics. There are multiple standard-setting organisations involved in Internet governance.⁴ Of these various organisations, the IETF has seen some of the longest sustained participation of civil society, including advocates bringing focus to the human rights-eroding properties of protocols. Moreover, the IETF is one of the few venues where anthropologists can observe how infrastructure is constructed. As such, the IETF provides an important venue for generating further knowledge about Internet infrastructure politics, in particular into the often-opaque decision-making processes of its corporate participants when responding to the political demands of the public.

The IETF is central to the continuing development of Internet infrastructure. To understand the precise role of the IETF requires a technical background on the functioning of the Internet standards the organisation produces. At their core, Internet standards are agreed-upon rules that facilitate compatibility between different Internet products and enable the exchange of information across its vast infrastructure. In a less technical and more widely recognisable register, this means that when individuals start the weekend by watching a movie on streaming platforms, they can do so because of standards. Companies like Netflix and Home Box Office (HBO) produce the content that is available on their platforms, and this content then moves from their servers to consumer devices across a network run by telecom providers (like British Telecom, Verizon, or Turk Telecom, depending on the country). On its journey from server to device, the content is routed by companies like Cisco or Huawei. Alternatively, content can be stored and delivered via a Content Delivery Network (CDN), run by companies like Cloudflare or Akamai, where physical proximity to the user guarantees fast loading times. Either way, these different steps require a range of companies to speak

⁴ For example, hardware and Wi-Fi standards are developed by the Institute of Electrical and Electronics Engineers (IEEE), protocols for the application layer of the Internet, like Hypertext Markup Language (HTML) are developed by the World Wide Web Consortium (W3C), the standards that enable access to cellular networks, satellites and radio spectrum are developed in the International Telecommunication Union (ITU).

the same language, so that they can transport data from their servers and networks to consumer devices.

This is where IETF Internet standards matter: without standards, these various companies would not be able to communicate effectively. The IETF's role in developing the Internet predates its commercial use. The organisation was instrumental in developing early networking technologies like the TCP and IP protocols, which enabled network devices to interconnect and internetwork. Shrouded in acronyms, the IETF is crucial to the Internet's continued functioning. Over the last three decades, the organisation has produced multiple key Internet standards. The IETF remains at the forefront of application and networking protocols. The IETF developed the widely used Hypertext Transfer Protocol (HTTP) for data transfer on websites, the Transport Layer Secure (TLS) security protocol that encrypts such data transfer, and the Quick UDP Internet Connections (QUIC) protocol, the first new data transport protocol deployed on a wide scale in two decades.

Dispersed throughout the IETF's technical discussions and argot of abbreviations are clear traces of how power is enacted through technology design. Infrastructural decisions and discussions about standards touch on who can control what aspects of the Internet. Standards thus provide a point of insight into the balance of power between the Internet's infrastructure companies and different users, depending on their functioning. For example, debates about 'token binding' in Hypertext Transport Protocol Secure (HTTPS) are fundamentally about who controls how online identity management works. Deciding whether to include 'spinbits' to measure latency in transport protocols like QUIC requires weighing the privacy needs of users with industry needs to monitor networks. Conversations about the Registration Data Access Protocol (RDAP) are always also discussions about the accessibility of information about domain name registrations, in what ways and for whom.

There are ongoing conversations about the relevancy of the IETF. Its importance is directly tied to market developments that see the management of the Internet consolidated in the hands of an increasingly small number of companies (Arkko 2020). One of my interviewees, who participated in the IETF since the early nineties, explained the ramification of this consolidation, 'Many companies no longer need to go to the IETF to talk with everyone, they can talk to the three other major big companies and solve it amongst them and then all of a sudden, like 89 per cent of the Internet runs on it'. If such companies are not interested in a particular standard, another interviewee told me, there is not as much incentive to proceed. Or in his exact words, 'If the big players don't want to use it, why are we even doing this?' This in turn means that a limited number of companies,

often those providing software for other businesses or directly to Internet users, have a lot of power within standardisation processes.

Some of these powerful companies include those that policymakers describe as ‘Big Tech’, the social media and online commerce companies whose directors are often invited, or summoned, to testify before legislators. Other such companies in the IETF are lesser-known Internet infrastructure players that build browsers, CDNs, or other key infrastructural products. Understanding the control these companies exert through Internet infrastructure provides a novel vantage point to scrutinise the potential harms arising from the growing power of ‘Big Tech’.

The IETF’s role within the larger ecosystem of organisations responsible for Internet infrastructure cannot be seen independently from these consolidation trends. However, the IETF’s continued relevance for the development of standards, and the insight the organisation provides into decision-making processes by key Internet actors ensure that it remains central site for studying the politics of Internet infrastructure. In a sector that is usually secretive and closed-off, especially in corporate settings, IETF meetings are relatively open and accessible. I track ‘the basic, the boring, the mundane, and all the mischievous work done behind the scenes’ (Peters 2015, 33) of the IETF, taking up these dynamics as windows onto corporate responses to civil society interventions in Internet infrastructure governance.

1.3 A Case Study of Human Rights Advocacy

In October 2014, three human rights advocates presented a bold idea to the IETF. They wanted to research how Internet standards impacted human rights. Related, the advocates sought to develop guidelines that IETF engineers could use to mitigate the negative impacts of their work and preserve ‘the Internet as a human rights enabling environment’.⁵ In this section, I provide a brief background on my case study by introducing the achievements, efforts and approach of the human rights advocates that I will further elaborate on in my literature review and methods chapter (Chapter Three and Chapter Four).

⁵ The charter and the various aims of the human rights advocates can be found here: <https://web.archive.org/web/20210212044445/https://datatracker.ietf.org/rg/hrpc/about/>

In October 2017, after three years of elaborate online and offline discussions, the advocates published their first, and thus far only, Request for Comments (RFC). RFCs are the IETF's formal format for publication. RFC 8280 'Research into Human Rights Protocol Considerations', outlines various 'human rights protocol considerations' that the IETF should take into consideration when developing protocols.⁶ After the publication of this novel human rights guidance document, advocates had limited success in getting IETF engineers to use RFC 8280 or incorporate the document's claims about the human rights impact of the IETF's work into the engineers' cultural understanding of protocols.

To achieve their goals, the human rights advocates set up a Human Rights Protocol Considerations Research Group (HRPC) in the Internet Research Task Force (IRTF). The IRTF functions as the IETF's research subsidiary and focuses on various research questions that span beyond the immediate concerns of Internet standardisation, such as improving global Internet access. Advocates defined human rights according to the international framework of the United Nations' (UN) Universal Declaration of Human Rights (UDHR). I follow the advocates' understanding of human rights closely and elaborate on this choice in Chapter Three, which contains my literature review. During its 30 years existence, several civil society and public interest technologists actively participated in the IETF (Cath 2021; Cath and Floridi 2017; Harcourt, Christou and Simpson 2020; Morris 2011). Still, the establishment of the HRPC human rights group marked the first time that civil society advocacy took part by way of a dedicated group in the IETF's research subsidiary.

The IRTF's work is often seen as qualitatively different from that of the IETF, which produces formal IETF standards. Yet, many of the individuals participating in the human rights work were in fact also active IETF engineers, showing the close connections between the conversations of the IETF and IRTF. While technically separate entities, there are many informal ties between those participating in the IETF and IRTF. Many IETF participants participate in both organisations; the incoming IETF chair (March 2021) previously chaired the IRTF. Conversely, IRTF research work often makes its way from the IRTF into IETF discussions and protocols, including the work of the human rights advocates. For example, in March 2017 one of the chairs of the human rights research group was invited to discuss human rights and protocols during the plenary meeting of IETF 98 in

⁶ For the full content of RFC 8280 'Research into Human Rights Protocol Considerations' see: RFC 8280. *Research into Human Rights Protocol Considerations*. Niels Ten Oever and Corinne Cath. <https://datatracker.ietf.org/doc/rfc8280/>. November 2018. As the careful reader will note, I am a co-author of this document and will elaborate on that in my research methods chapter (Chapter Four).

Chicago.⁷ While their work began in the IRTF, human rights advocates aimed to include human rights as structural considerations for standards development in the IETF. As such, throughout this dissertation, I will discuss my findings in terms of the IETF's politics and culture.

Over the span of my fieldwork, the advocates' approach became primarily oriented towards the IETF, rather than the IRTF. Halfway through my fieldwork in 2018, I saw advocates get involved in debates about data leakage in the Web-Real Time Communication (Web-RTC) protocol. This protocol supports real-time voice and video communication within web pages and helps video conferencing software, like Jitsi or Google Hangouts, work. However, sometimes Web-RTC leaks private IP addresses, which makes it possible to map someone's IP address to their identity. Such leaks could identify individuals who are connecting to each other.⁸ This leakage, the advocates argued, 'could be especially dangerous for users who care deeply about not being identified, such as whistle-blowers'. The human rights advocates were instrumental in devising updates to the Web-RTC protocol that addressed some of these concerns.

Throughout this process, what stood out was that the advocates approached the human rights-eroding properties of protocols as a direct result of design decisions in the IETF. The privacy implications of Web-RTC had been a well-known issue within the IETF. The case the human rights advocates brought forward about the potentially life-altering impact of such flaws for individuals in repressive regimes, however, provided a novel incentive to update the design. But IETF engineers were not always responsive to the concerns the advocates raised, and the advocates' claim that technical improvements are capable of immediate protection for human rights should not be taken at face value either.

Teasing out these overlapping affiliations and commitments, I position the work of the human rights advocates within the context of the IETF. My dissertation examines how the IETF's organisational culture, and the working practices of the individuals involved in developing Internet standards, stand opposite to the efforts of the human rights advocates. In this dissertation, I approach culture as 'a

⁷ See here for further details on this discussion:

<https://web.archive.org/web/20190524235941/https://www.ietfjournal.org/ietf-debates-its-role-in-supporting-human-rights-via-internet-protocol-development/>

⁸ To be more precise, private IP addresses are persistent identifiers, which can be reasonably linked to a particular device, computer or individual and used to track them over time as they access online websites and services. If a website misuses Web-RTC, this exposes the private IP addresses making it possible to identify the individual, device or computer. Depending on what Web-RTC is used for, this means it can be used to identify dissidents, whistleblowers or other at-risk populations.

fuzzy set of basic assumptions and values, orientations to life, beliefs, policies, procedures and behavioural conventions that are shared by a group of people, and that influence (but do not determine) each member's behaviour and his/her interpretations of the 'meaning' of other people's behaviour' (Spencer-Oatey 2008, 3). I take a practice-oriented approach (Abu-Lughod 1991) to studying culture by focusing on the 'loosely coordinated practices' (Seaver 2017, 4) that guide the IETF.

IETF culture shapes the collective social human behaviour of its participants and as such plays an important but scantily researched role in the limited success of the human rights advocates. My ethnographic account of the IETF's internetworking culture allows me to identify some key tenets driving protocol politics, like the IETF's anti-political engineering ethos and its engineers' 'non-prescriptive' view of technology, as structural barriers to addressing human rights concerns through standardisation. Given the IETF's reluctance to consider such pressing political questions, I will argue that Internet standard-setting bodies and other digital governance organisations should not function as blueprints for modern governance arrangements of the Internet.

1.4 Research Questions and Significance

This dissertation research relies on three years of ethnographic data collection (2017–2020), a range of archival materials, and 65 interviews to analyse the efforts of human rights advocates to introduce human rights values and 'repoliticise' the development of Internet standards in the IETF. Internet infrastructure companies often take proactive stances on issues like privacy and protection from government surveillance, which are then realised in infrastructure, including in protocol design (DeNardis 2009, 2014; Gürses, Kundnani, and Van Hoboken 2016; Harcourt, Christou and Simpson 2020; Rogers and Eden 2017; Myers-West 2021). This demonstrates that infrastructure companies and engineers can and do decide to use their positions to exert power over Internet infrastructure for certain politics, embedding their preferred cultural values and norms in the Internet's material infrastructure.

But the question remains *when* they are willing to do so. This question requires research focused on how and when infrastructural actors intervene, which I approach ethnographically through my focus on civil society participation and cultural dynamics in the IETF. The main research question

animating this project is: What role does IETF culture play in its infrastructural politics? To answer this question, I structure my empirical data chapters around the following sub-questions:

- What values, practices, and politics make up IETF culture?
- What motivates IETF participants to take up or set aside human rights values?
- How do IETF participants articulate responsibility for the impact of their protocols and politics on society?

My answer to the main research question will consist of these three constituent parts. These three sub-questions map onto my three empirical chapters (Chapter Five through Seven). In Chapter Five, I describe the IETF's engineering culture and contrast it to the cultural assumptions underpinning the human rights efforts. In Chapter Six, I examine how the engineers' anti-political engineering ethos informs their limited willingness to take up human rights values. In Chapter Seven, I map how the IETF's non-prescriptive view of technology orients engineers away from taking responsibility for the political properties of their protocols.

Answering these questions requires an ethnographic approach that provides deep insights into the IETF's functioning and the interpersonal dynamics that define it. Ethnography 'forcibly reminds us that the deeply affectual relation people have to infrastructures—the senses of awe and fascination they stimulate—is an important part of their political effect' (Larkin 2013, 334). Such affective connections to technology are commonplace in the IETF. My work builds on the few existing ethnographic investigations that consider the political effects of the human aspects of Internet governance (Mathew 2014, 2016; Milan and Ten Oever 2016; Myers-West 2018; Sowell 2012), with a distinct focus on the IETF. Currently, no ethnographies of human rights advocacy or protocol politics in the IETF exist, and the Internet's opaque infrastructural companies and their engineers have rarely come under ethnographic scrutiny. This has meant that the cultural forces and politics that guide these technologists, and infrastructure companies more widely, remain hidden from the public affected by the technology.

My ethnographic account builds on existing anthropological expertise concerning the relationship between humans and their machines, as well as the informal norms through which networks develop (Dunbar-Hester 2019; Forsythe 2002; Kelty 2008; Larkin 2013). I reveal the assumptions that standards' designers make about the nature of their work to demonstrate the normative force of these designers' collective culture for the Internet's infrastructure. In particular, I draw from the

critical approach to activism in technical communities as taken by Christina Dunbar-Hester (2019) to research the protocol politics guiding the IETF. Likewise, I build on the work of Keltz (2008) to map the network of social beliefs that animate technology development. I bring in the work of infrastructure anthropologist Brian Larkin (2013) to highlight how the meaning of infrastructure spans beyond its technical functioning and encompasses a myriad of complex human politics, including emotional attachments and aesthetics.

Within the field of Internet governance, academics are increasingly calling for further engagement with questions of power from the perspective of culture (Abbate 2017; Scholte 2020). Anthropology takes ‘the set of attitudes, values, beliefs, and behaviours shared by a group of people but different for each individual’ as its object of study (Matsumoto 1996, 16), making it well-positioned to tease out the role of culture in Internet governance. Yet, even in the most recent books on ‘researching Internet governance’ (DeNardis et al. 2020) anthropology and ethnography are overlooked. The key ethnographic methods of participant observation and interviews that I relied on can bring both the social construction of Internet infrastructure and the implicit politics of its architects into sharper view.

My ethnographic study extends beyond its immediate context, contributing on-the-ground insights to broader conversations about human rights organisations in Internet governance standardisation (Bortzmeyer 2018; Cath 2021; Cath and Floridi 2017; Harcourt, Christou and Simpson 2020; Kazansky and Milan 2021; Milan and Ten Oever 2016; Rachovitsa 2016a, 2016b; Rogers and Eden 2017; Ten Oever 2020a, 2020c; Zalnieriute and Milan 2019) and policymakers’ push for infrastructural Internet companies to protect and respect human rights (Kaye 2016; La Rue 2011; Puddephatt, Horner, and Hawtin 2010). My dissertation gives an account of what happens when Internet infrastructure organisations heed that call, explaining why and how they do so. Rather than questioning whether engineers properly understand human rights, I focus on *how* they understand them. As the Internet continues to expand its cultural and material reach over human life, such descriptive accounts can help support and steer the extension of academic and policy conversations beyond the well-covered grounds of Internet platforms and services, toward the lower layers of the Internet’s infrastructure.

1.5 Recoding Knowledge about the IETF's Culture

Civil society attempts to introduce novel norms into standards' design disclose the infrastructural culture that shapes the IETF's protocol politics. Despite their importance to the design of standards, the day-to-day functioning of the IETF and the cultural practices that guide it rarely come into public view. The IETF combines professional governance with an informal working ethos; my research reveals the cultural assumptions and principles that underpin both its seemingly unstructured discussions and its formal engineering practices. The discrepancies between what IETF participants say they do and what they actually do, or between the values they hold dear and the values they uphold in design, are especially revealing of its culture and how this culture mediates the inclusion of pressing public concerns in Internet standards.

My dissertation develops existing knowledge about these intricacies of standardisation at the IETF by examining how its culture is articulated, how its design principles are implemented, and which political relations its governance structure presumes. The first time I went to an IETF meeting in 2015, I was struck by the straightforward approach participants took with each other. The IETF participants resisted formal wear, often opting for t-shirts, jeans, and sandals. They addressed each other by their first names and were intimately aware of their colleagues' family histories, their children and grandchildren. They did not hesitate to bring up such personal information in technical debates, which were often highly confrontational (Cath 2021; 2021). Yet, this confrontational approach to work is barely captured in academic research on the IETF. Most Internet governance literature echoes the IETF's self-narration of its culture as 'inclusive and fair' (Abbate 2000, 208; Bygrave and Michaelsen 2009). But while its informal and direct practices might seem affable and even accessible, my work departs from the existing literature in that I found the organisation to be closed-off and inaccessible.

Some academics argue that Internet governance research should move away from examining the IETF. In fact, various academics have called the IETF 'overstudied', referring to IETF-focused research as 'looking for the keys under the lamppost' (DeNardis 2014; van Eeten and Mueller 2013). I would argue, however, that whereas some aspects of the IETF have certainly been subject to extensive debate, including the politics of protocols (Abbate 2000; DeNardis 2009, 2011, 2012, 2014), its culture has not. My ethnographic approach provides an *emic* account of the IETF; the IETF as understood by those in it (Kottak 2006). Focusing on what IETF culture means to those on its inside reveals how collective social behaviour shapes the core functions of the Internet, providing

a new vantage point on an “overstudied” but deeply important Internet infrastructure governance organisation. My ethnographic account allows me to illustrate political assumptions and particularities that often remain unarticulated but determine IETF culture’s “openness” as well as its exclusions, and with that, its technical decisions.

The IETF has a long history of politically engaged engineering. From the outset, its engineers actively discussed the various policy and social issues arising out of protocols (Braman 2011a, 2011b, 2012, 2013; Clark 2018). The IETF’s participant base has consistently included civil society representatives, even if they were usually a minority amongst corporate engineers (DeNardis 2009; Morris 2011; Morris and Davidson 2003). Bearing this history in mind, the human rights advocacy efforts are not novel. They continue and extend a minor thread in the IETF’s history. However, past efforts at bringing public good concerns to the IETF were significantly more limited in scope.

In this research, I argue that the engineers and advocates largely focused on issues that were directly relevant to communication rights and emphasised mainly those concerns that were prevalent in (early) technical communities, i.e. individualism, self-actualisation, privacy and freedom from government interference (Abbate 2000; Kely 2008; Myers-West 2021; Paris 2020). A large majority of IETF engineers does not account for or include the broader set of social considerations that arises out of protocols. Notably, issues of equity, justice and discrimination rarely come up in their discussions about the various social and policy concerns arising out of protocols. As such, my research calls for further discussion of what it means for academics to say that engineers are politically aware and engaged, and when we can do so.

This omission is striking because broader political conversations about the role of computing and networked technologies in the pursuit of equitable societies have been part of the IETF’s proceeding since its founding (Braman 2011a, 2011b; Finn and Dupont 2020). I explain this omission by analysing the cultural values animating politics in the IETF. The liberal infrastructural politics driving Internet architects explain their disregard for questions of rights and equity. This liberal orientation toward infrastructure derives from the network imaginaries that the architects of the Internet’s predecessors passed on to current-day Internet engineers. Engineers who worked on past networks approached the Internet as liberatory and identity-free, letting their designs be inspired by quintessentially American cultural values of individualism, liberalism and freedom (Paris 2020; Turner 2010). I will show how these liberal politics emphasising freedom, voluntarism, and individualism pervade IETF culture and, by extension, shape design decisions.

My work explains how the particular culture and politics of the IETF uphold the Internet as a commercial venture and maintain the relatively homogenous make-up of the organisation's engineering community, which primarily consists of European and North American men with technical backgrounds. In my empirical chapters, I show how the IETF's 'fun' and open culture underpins working practices, design principles, and narratives are exclusionary, especially to women, Global South participants and human rights advocates. I also examine what assumptions naturalise and support the IETF's specific politics and cultural values: an understanding of protocols as necessarily non-prescriptive that underpins standard design.

1.6 Recognising Power in Internet Protocols

Protocols define the rules for information exchange across heterogeneous Internet systems that make up the Internet's infrastructure. My research shows how IETF engineers exercise power by exerting control over the technical details of standards. IETF engineers decide on standards. Their decisions have direct implications for the economic and political externalities of protocols (Abbate 2000, 179), which is one of the main reasons why 'Big Tech' companies attend the IETF. As the primary architects of the internetworking standards that make these various infrastructures work, these infrastructure companies and their engineers wield power. The standards IETF engineers set, determine what is and what is not possible on the Internet, for whom, and in what ways.

Power, in this context, refers to the ability of the IETF engineers to enact their normative understandings of the moral and technological order of the Internet (Kelty 2008, 28). Through my focus on the IETF's informal culture, I show how engineers' normative understandings draw from a limited number of sociotechnical imaginaries of the Internet. I define imaginaries as 'collectively held and performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology' (Jasanoff 2015, 5). IETF imaginaries envision the Internet as an inherent good whose availability depends on uncurbed growth and a non-prescriptive ethos. As they enact these normative assumptions about the Internet in protocols, IETF engineers shape its material make-up in accordance with their politics and preferences. I build on these insights to explain how the cultural composition of decision-making in the IETF influences human rights efforts, which have had to adapt to the logics of the IETF's sociotechnical imaginaries and protocol politics.

My explicit consideration of the power exerted through protocols sets my work apart from existing academic work on the politics of technologists. Various academics assume that technical actors do not recognise the power they wield through their designs for digital systems (Coleman 2004; Green 2019a). In contrast, I argue that IETF engineers are well aware of their power and how it favours corporate interests over the concerns and needs of the public as expressed in human rights advocacy. However, the engineers purposefully obfuscate their awareness of this power through what I gloss as ‘engineered innocence’—a deliberately and socially constructed position of blamelessness for the real-world consequences of decisions made within the context of technology development. In the development of standards, this posture allows engineers to ward off calls for increased oversight and accountability.

The power that IETF engineers have over standards is a site of tension that looms large in Internet governance. In my empirical chapters, I locate the crux of protocol power (as well as its limits) and explain what that means for the responsibility the IETF has to consider the potentially harmful implications of their choices. Bringing engineers’ acknowledgement of power to the forefront recasts their dismissal of human rights concerns as an active political choice rather than an inevitable by-product of technical design. My understanding of the culturally distinct power dynamics in the IETF shapes my reading of its infrastructural politics and the future Internet contained within them. My work ‘repoliticises’ standards to reveal how they were never neutral or “innocent” of political consequences. Supported by my research, I argue that technologists can and should be held responsible for the impact of their work on the public good.

1.7 Infrastructural Politics for the Public Good

The companies maintaining and standardising Internet infrastructures are increasingly involved in politics and decision making on behalf of the public (DeNardis 2009, 2012, 2014; DeNardis and Musiani 2015; Donovan 2019; Gillespie et al. 2020; Harcourt, Christou and Simpson 2020; Musiani et al. 2015; Van Geuns and Cath 2020). My findings in this dissertation have broad consequences for these ongoing debates about Internet infrastructure politics and corporate power. The infrastructural companies residing below the Internet’s consumer services and applications are increasingly taking centre stage in these debates (Cath 2021; DeNardis 2009, 2012, 2014; DeNardis and Musiani 2015; Donovan 2019; Musiani et al. 2015; Van Geuns and Cath 2020). Academics,

politicians, and civil society have criticised infrastructural companies for their haphazard interventions and inconsistent or opaque policies concerning content moderation, access to information, human rights, and free speech (Cath 2021; Donovan 2019; Kaye 2016, 2017; Taylor 2021).

The central problem these critiques identify is a lack of accountability. Internet infrastructure companies frequently exercise their power: Amazon, for example, decided to suspend its hosting services to right-wing social media company Parler in the wake of the storming of the United States Capitol by right-wing agitators on January 6th, 2021.⁹ Similarly, in 2019 security company Cloudflare cut its services to an imageboard used by the shooter of the El Paso massacre in the United States, effectively rendering it inaccessible. Cloudflare’s response to calls to rescind its services to clients hosting right-wing extremist content was wavering, which is visible in how this response turned overnight. In less than 24 hours, the company went from denying any legal obligation to remove such clients to cancelling their contracts because these clients were ‘a cesspool of hate’.¹⁰ If these companies had not acted, it is possible that more people would have felt inspired to similar acts of violence (Donovan and boyd 2021). However, Internet infrastructure companies are rarely held accountable for the crucial decisions they make.

When Internet companies cease to provide infrastructural services, they are making choices with public values in mind, without the requisite democratic legitimacy to do so (Taylor 2021). This trend is likely to continue, as content moderation and other technology policy interventions move ‘down the Internet’s stack’ and thereby becoming increasingly driven by infrastructural politics (DeNardis 2009, 2012, 2014; Donovan 2019; Gillespie et al. 2020). The opaque decisions these companies make reverberate across electoral politics, law enforcement, education, and human rights advocacy, as this dissertation details. Samir Passi and Phoebe Sengers argue that ‘Researchers’ ability to effectively address responsible design requires understanding and addressing how and why practitioners choose to make systems work in specific ways’ (2020, 9). Still, the values, motivations and politics steering such infrastructural decisions often remain obscure to the public they affect. Key players in the contentious debates about content moderation through infrastructural decisions are no exception.

⁹ For details on this decision, see: <https://web.archive.org/web/20210123005547/https://www.nytimes.com/2021/01/09/technology/apple-google-parler.html>

¹⁰ For the blog in which Cloudflare’s CEO outlines his wavering decisions, see: <https://web.archive.org/web/20210113104003/https://blog.cloudflare.com/terminating-service-for-8chan/>

The vacillating views of corporate executives, and their policy teams, provide an unstable foundation for conversations about responsibility for services rendered through infrastructural support. My ethnographic approach focuses on exactly these cultural actions and politics. Currently, too little is clear about the values and concerns that guide corporate decisions, which as a corollary means that there is little or no recourse for those experiencing negative consequences of company decisions to cut, or provide, infrastructural support.

My dissertation expands our knowledge of how and why Internet architects choose to make political decisions, build systems or set Internet standards in the way that they do. This knowledge will be integral to the development of theoretical and policy frameworks that define corporate responsibility in distributed systems and hold Internet infrastructure companies accountable for the power they exercise.

1.8 Theoretical and Policy Implications

My dissertation reveals the promises and perils of doing human rights advocacy work among Internet infrastructure companies. Now that the policy implications of these companies' technical decisions have come to public attention, my work questions whether direct civil society engagement with the engineers working for such companies can fundamentally change the infrastructural politics that drive their cultural decision-making. My research intervenes in theoretical and policy debates at the intersection of infrastructural politics, Internet governance culture, and human rights advocacy. In this section, I will first identify the critical juncture at which infrastructure companies find themselves. Subsequently, I outline the implications of my research for the stakeholders I focus on: infrastructure companies, civil society, policymakers, and academics. I conclude by outlining the specific theoretical contributions my work makes to ongoing academic debates in Internet governance.

Internet infrastructures and their technical governance bodies are increasingly sites of political contention (DeNardis 2009, 2012, 2014; DeNardis and Musiani 2015; Milan 2013; Milan and Ten Oever 2016; Musiani et al. 2015; Wright 2012). Companies, States but also civil society actors seek to use the infrastructure for their political agendas, and in this sense, politics have always been part of technology governance. Over the past few years more examples have begun to enter mainstream discussions. Infrastructure companies and the people running them have not managed to come up

with consistent responses to calls asking them to consider the public good. Companies try to position their work to have it both ways: visibly align themselves with current social justice causes¹¹, while also maintaining they cannot be held to account for their corporate decisions when these are implicated in human rights violations. In addition to the opacity of their decision-making processes, the lack of consistency in companies' and organisations' responses raises the spectre of their power (and the responsibilities that come with such power) with civil society, policymakers, and academics.

My findings lead to clear recommendations for civil society actors. The advocacy efforts within the IETF exemplify a broader trend of civil society organisations expanding their work to consider the impact of Internet infrastructure on human rights. Well-known rights organisations like the American Civil Liberties Union (ACLU), the Centre for Democracy and Technology (CDT), the Electronic Frontier Foundation (EFF) and ARTICLE19, work on Internet infrastructure, including through direct participation in Internet governance organisations. Their sustained engagement would suggest that such organisations play an important role in changing technology policy from inside the consultative process of Internet governance in the IETF. My ethnographic account shows how culture and people are constitutive of the limits that human rights advocacy in Internet governance encounter, which suggests that future civil society efforts and their funders might increase their efficacy by redirecting or expanding some of their advocacy.

My research provides a clear roadmap for policy interventions in Internet governance. Policymakers are calling on civil society to participate in technical organisations and bring human rights values to these spaces. But as long as the effects of such interventions are not known, they may give the appearance of accountability without actually ensuring that infrastructural decisions are made considering their impact on human rights. My ethnographic account shows that while the human rights advocates bring underrepresented, but deeply relevant, viewpoints to the IETF, their peripheral status in the organisation's cultural machinery structurally hampers their efficacy. My findings should give pause to broad policy calls for the inclusion of human rights values in the Internet's infrastructure. Instead, policymakers should emphasise tailored approaches, devising

¹¹ For example, Cloudflare quickly made use of the chance to publicly discuss its governing choices in the context of the protests that broke out after the murder of George Floyd, a black man who was killed by the police in May 2020 in the United States. His death spurred a wave of anti-racism and Black Lives Matter protests across the globe. Writing that the protests can be catalysts for change, but only if they can be heard, Cloudflare proudly claimed to make this possible by offering activists protection from cyberattacks. They are far from the only tech company seeking to ally itself with antiracist protests: IBM, Amazon, and Microsoft all announced that they would no longer provide facial recognition technology to US-based law enforcement. See: <https://web.archive.org/web/20210310142530/https://blog.cloudflare.com/cyberattacks-since-the-murder-of-george-floyd/>

accountability mechanisms for the effects of digitally distributed systems that take the particular cultural dynamics of a given organisation into account.

My work also has implications for ongoing academic debates. Infrastructural politics' position in the spotlight should move Internet governance academics to directly consider the 'responsibility of technology corporations that act as the infrastructure' (Donovan 2019, 1) for a number of political processes, including for human rights. I argue that this focus on power and responsibility also requires a better understanding of the cultural motivations driving infrastructural companies, including in organisations like the IETF and its participants. To do so, I call on the field of Internet governance to expand its theoretical and methodological parameters. My dissertation furthers an understanding of power and culture by making several specific theoretical contributions to the literature on Internet governance.

My ethnographic findings create and identify points of difference and nuance in three main areas of interest in Internet governance literature: the infrastructural turn, the role of human rights advocacy in Internet governance, and IETF culture. Internet governance research in the first two domains has facilitated important debates about the politicisation of the Internet's infrastructure, to the point that the field considers the IETF overstudied. But the broader theoretical value of doing research on human rights advocacy in the IETF lies not only in understanding of how infrastructural decisions are political but also in considering how these politics are cultural. As a contribution on IETF culture, my dissertation does not limit itself to the question of how the minds of technologists are translated to their machines but also questions the extent to which human rights advocates can change engineering minds.

1.9 Research Outline

This dissertation consists of eight chapters, including this introduction. Chapter Two gives a historic overview of the development of the Internet that focuses on the sociotechnical imaginaries that drove early Internet architects. In that chapter, I use insights from critical social sciences to argue that the Internet's development was guided by partial, 'techno-optimistic visions'. These visions see technological progress through the development of the Internet as automatically leading to the betterment of humankind. At the same time, these visions did not attenuate the Internet's principal architects to questions of justice and rights. This particular historic legacy, I argue, continues to define

engineering in the IETF and remains a key part of the connection between technical functioning and social specificity in Internet infrastructure design.

Chapter Three presents my literature review and analytical framework as rooted in ‘critical Internet governance’. That chapter outlines how I use theories from anthropology to intervene in academic debates about Internet governance, including those on IETF culture, human rights advocacy, and the ‘turn to the Internet’s infrastructure’ (DeNardis 2012; DeNardis and Musiani 2015; Musiani et al. 2015). I argue that the cultural contours and technical functions of the Internet’s infrastructure are inherently connected and should be approached as such when theorising infrastructural politics. My focus on the directive force of IETF culture and mundane practices offers new insights into Internet governance’s ‘embedded power hierarchies’ (Scholte 2020, 18-19) and their imbrication with ongoing human rights efforts.

In Chapter Four, I discuss my field site and introduce my anthropological research approach. This chapter articulates the distinct contribution anthropology can make to conversations regarding the role of power and culture in Internet governance. I start by discussing my philosophical foundation in critical constructivism. Subsequently, I discuss my ethnographic methodology, reflecting on the method as a practice and on its data sources, as well as its limitations. Finally, I articulate the ethical framework structuring my approach and the considerations that came up as I conducted my research.

Chapter Five is the first empirical data chapter, an analysis of the IETF’s culture through its protocol politics. Existing literature on this topic skews toward presenting the organisation’s principles and practices as fair and accessible, but my empirical account of its cultural dynamics indicates that the lived politics of the IETF are better understood as conservative and exclusionary.

I show how the IETF’s working practices are closely aligned with cultural practices of masculinity in technology communities of practice in Europe and North America, that value a confrontational and individualistic approach to engineering. I argue that these cultural practices are exclusionary to women and Global South participants and complicate the work of the human rights advocates by rendering overtly political subjects, like human rights, out of scope for Internet engineering.

Chapter Six details the anti-political engineering ethos that determines IETF participants’ approach to technology design. This ethos leads many engineers to argue that the legal values brought up in relation to human rights have no bearing on their ‘machine-to-machine’ protocols. Engineers resist

including human rights values because they understand such inclusion as acquiescence to oversight by a centralised State authority. This (perceived) governance model directly contravenes the IETF's cultural value of administration through private governance, or as the engineers often call it, as governance through 'rough consensus and running code', by which they through mean bottom-up processes and market-responsive technology development. My findings attribute the long-term powerlessness of human rights advocacy efforts to cultural particularities: the IETF's engineering ethos and its technocratic governance process.

Chapter Seven analyses the sociotechnical imaginaries that guide IETF engineers. I argue that an ideological commitment to 'protocol non-prescriptiveness' underpins the engineers' understanding of responsibility. I introduce the term 'protocol non-prescriptiveness' to describe the notion that IETF participants cannot and should not prescribe how their products are used. This 'non-prescriptive' imaginary chafes against the prescriptive approach taken by the human rights advocates. My empirical account of engineers' limited willingness to consider their responsibility for the impact of their work teases out the consequences of letting technocratic elites self-govern. At the same time, I reflect on the consequences of the advocates' limited, 'tech-essentialist' (Cohen 2019, 4; Myers-West 2021, 9) conception of societal change, which situates power and political change in technology rather than in human action.

Chapter Eight concludes this dissertation by explaining what my findings mean for the theoretical foundations of Internet governance scholarship. I explicate how ethnographic insights about human rights advocacy challenge academic assumptions about the boundaries between the social and technical functions of Internet infrastructure. Understanding how culture shapes technologists' approaches to designing standards sheds new light on their rejection of political questions related to human rights, justice and equity.

My findings demonstrate that the culturally particular imaginaries that encourage or limit the use of protocols for various political goals are a crucial topic for civil society, policymakers, and academics who work on human rights, Internet governance, and infrastructural politics. Ultimately, my dissertation demonstrates how the IETF elides concerns about justice and human rights, making it a case study that underlines that, *lo and behold*, technical communities should not 'set the standard' for corporate responsibility in distributed systems themselves.

2. Internet Histories: Partial Visions of People and Packets

2.1 Introduction

Internet history has progressed from a history of the technology to a history of modern communication. It is now intimately entwined in all aspects of our lives, so “Internet history” will shortly be indistinguishable from “human history”.

Steve Crocker cited in Brügger et al. (2017, 1)

Internet history is contentious in the academic community. Its multiple origins—in Cold War-era government-funded academic science labs (Abbate 2000; Naughton 2016) and countercultural movements (Turner 2010)—make the Internet’s history difficult to capture in a single story of technology. In this chapter, I highlight a through-line in these research efforts: the techno-optimistic visions, the flawed notion that the development of the Internet leads to the betterment of humankind (Benjamin 2019b; Tutton 2020), that guide the Internet’s development and make its principal architects largely unresponsive to questions of justice and rights. I trace the technical development of the Internet with a focus on the close connection between the social and technical demands its architects put on the network’s functioning. In doing so, I demonstrate how the shared visions of these influential people overlook key political questions. I argue that these oversights continue to orient current-day Internet engineers to reject responsibility for the rights-eroding properties of protocols.

At the heart of the Internet’s historic development lie human networks and cultural protocols that guided the development of the technologies that enabled early Internet networking. These social dynamics, and the Internet’s architects that drive them, provide the invisible backbone that makes daily Internet usage possible. Many researchers focus on this backbone in terms of its technical, rather than its social, properties. Ava Kofman (2019, 1), for example, states, that ‘The invisible networks that govern our digital “traffic”, a cross of fibre-optics, copper cables, and electromagnetic frequencies, do not lend themselves easily to the imagination’. While the vast network of these opaque technologies might not be easy to imagine for its daily users, they are guided by how technologists envision the Internet. In this chapter, I demonstrate that these visions of technology can and should be made apparent and analysed for their political effects.

These visions, or ‘sociotechnical imaginaries’ (Jasanoff 2015), have driven recent critical scholarship that explains how ‘libertarian imaginaries of an identity-free and bodiless sociotechnical future shaped the Internet’ (Paris 2020, 8). Sheila Jasanoff defines sociotechnical

imaginaries as ‘collectively held and performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology’ (2015, 5). Such visions have taken centre stage in historic analyses of the Internet’s development (Abbate 2000; Braman 2011b; Naughton 1999; Turner 2010). Academic history focuses on a handful of individuals because, ‘governance in this first generation [Internet] has been exercised under the relatively strong influence of individual persons’ (Bygrave and Michaelsen 2009, 93). Jasanoff remarks that the biographies of individuals are not the clearest path to uncovering the origins of imaginaries. However, a focus on a small group of key individuals can provide insights when these actors ‘mobilise the resources for making their visions durable’ (Jasanoff 2015, 35–36), as happens when technologists and engineers translate their visions for the future to the material design of Internet protocols.

This chapter presents a critique of the oversights in the sociotechnical imaginaries guiding the Internet’s development as generated by a small group of mostly white male scientists, and some of the historic academic work that has held these architects up as great visionaries. This myopic historical approach overlooks the invisible labour of women and people of colour who played a crucial role in creating the Internet (Abbate 2012; Amrute and Muri 2020; Eglash 1999; Hicks 2017; McIlwain 2019). Academic investment in these “original” imaginaries has elided discussions of racism, sexism, political inclusion, and equity in Internet governance (Benjamin 2019a, 2019b; Gürses, Kundnani, and Van Hoboken 2016; Myers-West 2021; Nakamura 2013; Nelson 2002; Noble and Roberts 2019; Paris 2020). I build on this critique by demonstrating how a historic concern with a cadre of elites has led to a surprising lack of criticism in Internet governance literature about the “grand visions” of early Internet architects as being insensitive to human rights concerns.

I approach the history of the Internet to reveal what was missing in its imagined liberatory potential. Steve Jones and Guillaume Latzko-Toth (2017, 60) contend that ‘Contrary to the canon of the history of Transmission Control Protocol-Internet Protocol (TCP-IP) and Advanced Research Projects Agency Network (ARPANET), there is no single, simple history of the Internet; instead, it should be seen as a set of multithreaded, parallel histories, most of which are still to be told.’ The recent publication of such untold histories, ranging from the crucial role of women in British computing (Hicks 2017) and African-American communities to the Internet’s development (Brock 2020; McIlwain 2019), provides new insights into who and what threads together the Internet’s functioning. Technological work inspired by American ideals of

individualism, liberalism, and freedom excludes the contributions of these communities (Paris 2020; Turner 2010; Myers-West 2021). My research similarly speaks to the political and exclusionary effects of the historic visions of the Internet as liberatory.

Steve Crocker—one of the Internet’s fabled architects quoted in this chapter’s opening—argues it is only recently that the Internet’s history became indistinguishable from that of humans. His starting point for the overlap between people and packets is the recent pervasiveness of the Internet. I take a different approach that introduces the Internet’s development from a vantage point of cultural anthropology, which views ‘programming devices as human choice’ (Nelson 2021)—even before the Internet’s commercialisation and popularity. However, I align myself with Crocker’s instinct to approach the Internet as human history. As one of my interviewees told me, ‘The IETF and the Internet have always been built by people living in actual society’. Telling a human history of the Internet, allows me to locate its people and packets in their social connection and demystify how networks are reciprocally shaped by culture.

This chapter is based on archival research, secondary literature review, and my engagement with primary historic resources, ranging from mailing list archives, government and academic budgets, to technical documents outlining interoperability requirements, and even poems¹² dedicated to the Internet by its early architects (see Appendix I for data sources and Chapter Four on methods). I also include insights from my interviews and conversations with Internet architects. My historic overview is necessarily incomplete because the Internet is relatively young. Its histories (Abbate 2000, 2012, 2017; Hafner and Lyon 1998; Naughton 2016; Turner 2010, 2017) and counter-histories (Clark 2018; Hicks 2017; McIlwain 2019; McKelvey and Driscoll 2019; Rankin 2018) are still being written. Yet, I draw from a vibrant tradition of historical analysis of the Internet (Abbate 2000; 2017; Braman 2011a, 2011b, 2012, 2013, 2017; Brown and Ziewitz 2013; Clark 2018; Ensmenger 2015; McKelvey and Driscoll 2019; Starosielski 2015; Standage 1999; Turner 2017) to locate the human in the machine.

¹² RFC 1121. *Act One - The Poems*. Jon Postel, Leonard Kleinrock, Vint Cerf, and Barry Boehm. <https://tools.ietf.org/html/rfc1121>. September 1989.

This chapter is organised as follows. First, I give a *Brief Historical Overview* of the Internet's development and technical design. In it, I show that the Internet's technical functions are inextricably linked to its social functions, illustrating the force of the Internet's sociotechnical imaginaries of individual liberation and optimism in shaping its material design. Understanding this close link between people and packets allows me to explain why so few early, and current, Internet architects structurally consider their role in maintaining sociotechnical inequities. I refashion this dynamic as an active political choice on the part of the architects rather than a technical incompatibility between social concerns and networked technologies. Doing so, helps me set up my literature review (Chapter Three) in which I outline the limits of current Internet governance theories, especially those postulating that the technical functions of the Internet's infrastructure are being co-opted for adverse political agendas (DeNardis 2012, 2014; DeNardis and Musiani 2015; Musiani et al. 2015).

Second, I will briefly cover *Internet Advocacy* efforts between 1960 and now to include urgent societal concerns in the development of the Internet. This section allows me to locate my case study on human rights advocacy as part of a long history of socially engaged engineering within the Internet Engineering Task Force (IETF). I demonstrate that these well-intentioned efforts are often rooted in the same flawed sociotechnical imaginaries of techno-optimism and unable to address the broader sociotechnical inequities raised by the Internet. I *Conclude* by outlining how my historic positioning allows me to explain why the negative effects of the imaginaries guiding the Internet's early development carry over into human rights efforts in contemporary Internet governance.

2.2 A Brief History of the Internet

Because the IETF is an organisation of people, it is important to present a brief overview of the Internet's *human* history. In this section, I will trace relevant historical research on Internet governance of protocols and networking culture. Networking protocols 'Are the rules, or blueprints, that enable interoperability among technologies made by different manufacturers. Routine Internet use involves the direct engagement of hundreds of protocols' (DeNardis 2012, 723). The Internet protocols that enable this use are developed in industry-led standard-setting bodies, like the IETF.

By highlighting the close relationship between protocols and people, I show how the cultural particularities of the United States and European universities and the political backdrop of the Cold War led to visions for the Internet's future being enunciated by a small community of people. This community was often relatively homogenous, being predominantly white, male and Western, technically savvy, and university educated. As such, these Internet architects were predisposed to take on questions of government surveillance, individual freedoms and liberties, rather than those related to social justice, anti-discrimination or economic equity (Myers-West 2021; Nakamura 2013; Nelson 2002; Paris 2020; Turner 2010). Together, these people produced a conservative culture that continues to influence the Internet's design and governance, including at the IETF.¹³

The Moonshot Internet: The intergalactic computer network

There are many points in time that could be called the 'birth of the Internet'. In this chapter, I understand it as the development of packet-switching and Internet protocols—the networking techniques at the heart of the current Internet and this dissertation—against the background of the Cold War. In 1963, J.C.R. Licklider wrote a memo to the members and affiliates of the 'Intergalactic Computer Network'.¹⁴ Licklider was the first director of the Information Processing Technology Office (IPTO), at what was then the United States Department of Defence's (DOD) Advanced Research Projects Agency (ARPA). ARPA was established in 1958 to research and develop defence-related technologies.¹⁵ There, Licklider was involved in developing the vision of human-centric computing (Abbate 2000, 43) that made the Internet possible.

Licklider highlighted several barriers to creating a network of computers. In his memo, he mentioned the need for creating norms regarding a shared language for the control of this network. The development of human (as well as technical) standards for interoperability was of concern to engineers dreaming up and developing the Internet's precursor. Particularly relevant

¹³ Throughout this work, I follow the definition of conservative as set out by Green (2019a, 14). He argues that many technology communities are conservative in their focus on maintaining the status quo, rather than implying a political alliance. In the next chapter, I will further elaborate on the shape of this cultural conservatism in the IETF.

¹⁴ Memo retrieved from: <https://www.kurzweilai.net/memorandum-for-members-and-affiliates-of-the-intergalactic-computer-network> and subsequently archived at <https://web.archive.org/web/20201117162215/http://www.kurzweilai.net/memorandum-for-members-and-affiliates-of-the-intergalactic-computer-network>

¹⁵ ARPA was created by United States President Eisenhower in response to the Russian Sputnik launch, known as the 'Sputnik Surprise'. One of its main goals was to 'keep the technological superiority in the hands of the United States'.

is Licklider's (1963) recognition that the development of the 'intergalactic network' is prefaced on a close relationship between minds and machines:

In the first place, it is evident that we have among us a collection of individual (personal and/or organisational) aspirations, efforts, activities, and projects. These have in common, I think, the characteristics that they are in some way connected with the advancement of the art or technology of information processing, the advancement of intellectual capability (man, man-machine, or machine), and the approach to a theory of science. The individual parts are, at least to some extent, mutually interdependent.

Licklider recognised that the aspirations of the individuals addressed in the memo and the future of the network were inexorably bound.¹⁶ His vision outlines a future when the norms for connections between machines—articulated as homogeneity through shared protocols, integrated network operation, and cooperative programming and operation—also guide the connections between the people building them.

Licklider's vision was an early example of the blurring of technology's social and technical functions. He suggested that it was complicated to disentangle the technical design functions from its social aspirations. This entanglement was then further compounded by the Internet's early development and governance being propelled by a sense of community and mutual benefit (Abbate 2000; Turner 2010). This sentiment notwithstanding, sometimes the different groups involved in the development of early Internet technologies—primarily government employees, scientists, and private technology companies—clashed. Tensions over whose interpretations of the technologies' function and meaning should prevail undergirded many discussions about technical functionality.¹⁷ These tensions indicating that the nature of the Internet is socially, rather than technically, constructed.

The title of Licklider's original memo (the 'Intergalactic Network') was only partly in jest; it reflects the often-recurring theme of space exploration dominating the political agenda of that era. There is, for instance, a direct link between the Soviet Sputnik launch and the Internet, as will be covered later in this chapter. In many ways, techno-optimistic 'moonshot' thinking (Tutton 2020), a utopian view of technology as able to foment positive change in society by solving current and future problems through technology, remains a crucial component of Internet governance.

¹⁶ It is interesting to note that throughout the memo, Licklider frames his examples by using the pronouns 'he, him, himself'. His reliance on gendered language speaks to the continued vision of the fields of internetworking and computing as being meant for, and populated, by men.

¹⁷ A famous example detailed in the work of Abbate (2000) is the decision by Paul Baran to withdraw his proposal for the creation of a distributed communications network. Baran said he did not have faith in the ability of the United States government arm made responsible for building the network to execute on his technical vision.

This view encourages Internet architects to set their sights on the stars, rather than concerning themselves with how their technologies might exacerbate social inequities on earth.

In Licklider's vision, technology reflected both research and (US) military interests¹⁸ but he did not explicitly include civil society interests or questions of justice and rights. This oversight is unsurprising since much of the early thinking around whose values and views were needed to develop the Internet was prefaced on the notion that all of its users were also its producers. Paris describes its producers as techno-utopians who 'enjoyed a privileged position within the racial, gendered, and socioeconomic structures of the United States in the late 1960s to early 1970s' (2020, 8). Their idealistic (and intergalactic) visions for the Internet, and privileged positions, meant they were perhaps less aware of how their technologies and policies overlook structural inequalities like poverty and discrimination.

In subsequent years, academics like Leonard Kleinrock, Paul Baran and Donald Davies elaborated on Licklider's intergalactic vision. Kleinrock provided an important part of the mathematical theory to support what is now often referred to as the 'first paper on packet switching theory' (Leiner et al. 1997). Baran (1960, 1964) published a series of papers in the 1960s laying out his design for distributed networks based on packet-switching.¹⁹ Instead of using techniques based on telephony's circuit-switching model that sent entire messages sequentially, Baran was inspired to find more resilient technology that could survive a nuclear war. His technique broke messages down into small packets that were sent across the network using different routes, then reassembled at their destination. Although he never used the term 'packet', he implied this technology was a fundamental break from the common circuit-switching practice for the transmission of data.

Concurrently, a researcher at the United Kingdom's (UK) National Physical Laboratory (NPL), named Davies, developed a similar technology in which he explicitly refers to units of information as 'packets'.²⁰ His vision was not to create a network that could survive a nuclear war but to make accessing time-sharing computer resources, the then common way individuals used

¹⁸ US military concerns in this particular case revolved around the heightening tensions between the United States and the Union of Soviet Socialist Republics (USSR) and the 'shadow of nuclear war' (Abbate 2000, 1). Accordingly, the early Internet architects focused on developing a system that was distributed across many nodes with a high level of redundancy.

¹⁹ For the full paper see:

<https://web.archive.org/web/20210214011003/https://www.rand.org/content/dam/rand/pubs/papers/2008/P1995.pdf>

²⁰ For the full paper see:

https://web.archive.org/web/20180602162037/https://link.springer.com/chapter/10.1007%2F978-94-010-1226-3_5

computers, more efficient. The need for sharing computing resources arose from the cost of owning computing resources and the inefficiency of leaving them idle between computing cycles. Sharing computing resources allowed computers to be available to more universities, including those that could not afford physical computers on campus. Together, Baran, Davies, and Kleinrock provided the technical foundation of the Internet as it is known today. Their vision for communication networks, mediated through packet-switching technologies and protocols, United States (US) politics and academic needs, inform the Internet's governance culture—as becomes visible in the next instantiation of networked communication.

The Military Internet: Advanced research projects agency network

Researchers involved in the early development of networked communication technologies coalesced around creating the Advanced Research Projects Agency Network (ARPANET). Lawrence Roberts, who like Licklider and Kleinrock studied at the Massachusetts Institute of Technology (MIT), joined ARPA in 1966. He was familiar with the work of Davies and Baran and applied their ideas in an early packet-switching system—the ARPANET.²¹ This network, Sandra Braman argues, 'ultimately defined the Internet, and so study of its design process is of particular value' (2012, 29). As mentioned, ARPA was an agency of the United States DOD and ARPANET's governance body would later evolve into the IETF. This makes ARPANET's history and vision for the network relevant to understanding that of its contemporary.

The technical design of the ARPANET, like the Intergalactic Network, indicates that technical functions are inherently tied up with social functions and guided by shared visions of what a network should be. ARPANET's use of packet-switching provided several distinct technical advantages over the era technology of circuit-switching. First, it improved efficiency. Unlike circuit networks, ARPANET allowed multiple packets to be sent over one physical circuit—an impossible task for circuit-switching networks. This was an important innovation for researchers who time-shared computers. Second, packet-switching was less impacted by network failures. If a node in the network failed, the packets were dynamically rerouted, making the ARPANET more resilient. Third, the ARPANET approach improved data security, because packet-switching made it harder for messages to be intercepted in their entirety. All three technical

²¹ This network was different from previous packet switching networks as it was the first one to implement the TCP-IP suite.

advantages reflect distinct social needs of that period, showing a direct link between the network's technical design and its social functions.

But how are these needs articulated, who does so, and what is missing?²² The first advantage—efficiency—indicates how culturally contingent human needs, visions, and demands shaped the technical design. Although funded by the United States DOD, ARPANET was not created for the sole purpose of war. It addressed another fundamental social need: cost reduction through resource sharing (Abbate 2000). From the Licklider memo to the Davies paper and ultimately the development of ARPANET, researchers are fuelled by the question: How can we increase access to time-sharing computers while decreasing the associated costs (McKelvey and Driscoll 2019)? ARPA provides an answer that enables a small number of researchers across the country to share computing resources. One of its designers explained in 2019:

The motivation behind building the network was not to build a system that would survive a nuclear attack, which is something that some people misunderstand. Paul Baran was working on that problem at RAND, but what Larry Roberts was asked to do was to figure out how to build a network that would allow multiple computer science departments to share their computing resources.²²

The network's design was informed by the social need for efficiency, which in turn was driven by the larger academic cultural context the technology was embedded in. This led the ARPANET developers to focus on the resource-sharing characteristics set out by Davies rather than the military concerns raised by Baran (Abbate 2000; Mathew 2014). That is, ARPANET's design reflected the specific social demands and aspirations of that era and the people involved in the network's design. These demands also reflected the enduring cash-strapped politics of academia and government.

The history of ARPANET demonstrates how cultural and technical demands have both impacted network design and functions. Not represented explicitly in these discussions are the anti-war, civil rights, and racial justice movements that gained prominence in this same era (Turner 2010). The relevance of the network to these questions was largely ignored by ARPANET architects. The political demands put upon the network, as well as those not

²² See 05:45 - 06:02 min. of a recent American Association for the Advancement of Science (AAAS) meeting to 'Celebrate the 50 years since LO', which is seen as the first successful inter-computer message transmitted from UCLA to the Stanford Research Institute (see Chapter One). The meeting brought together Vint Cerf, Stephen Crocker, Robert Kahn, Leonard Kleinrock, and David Walden, who had all been involved in the development of the ARPANET. <https://livestream.com/internetsociety/arpamet50/videos/188056000>

considered relevant, have lasting consequences for its current governance models and technical design.

A primary goal of ARPANET was to connect disparate computers in the network. It might seem like a simple feat now, but as Janet Abbate describes, 'building a long-distance packet switching network to connect diverse computers would be a formidable task, even for an agency with ARPA's resources and its mandate for advanced research' (2000, 46). To understand the ARPANET's governance model and its continued relevance for the current Internet, it is important to understand its technical foundations: modularity and protocols.

Modularity

The ARPANET network architecture is modular. It has four layers (top to bottom): the application (or process) layer, the host-to-host layer, the Internet layer, and the network interface (or local network layer). The application layer provides services to end nodes, enabling them to communicate with applications and other computers. The host-to-host layer enables communication between the application layer and the lower layers. It is responsible for transporting data and ensuring data integrity between sending and receiving hosts (Miller 2005). The Internet layer routes packets between hosts using, among other tools, the Internet Protocol (IP). Finally, the network interface consists of the physical link between the network's hardware, which is responsible for transporting data between hosts on a physical network (Reynders and Wright 2003).

When visualised in a stack (see Figure 1), ARPANET's modularity is evident: the network architecture shows hardware at the bottom, operating systems in the middle, and applications at the top.

Layers
Application (or process) layer
Host-to-host layer
Internet layer
Network interface (or local network layer)

Figure 1: ARPA Architecture

Modularity is a social principle that allows for objectives and responsibilities to be partitioned. Ashwin Mathew (2014, 33) describes it as ‘a separation of concerns’. This separation of concerns would come to be applied to ARPANET’s governance model and continues to play a crucial role in the culture of the IETF, as I will document in my empirical chapters (Chapter Five–Seven). Separation allows network engineers to develop the network with specific protocols, each responsible for a specific limited set of tasks without knowledge of the entire network (Clark 2018). In other words, separation enables engineers to develop the Internet as a modular network architecture and govern it accordingly.

ARPANET’s modular design continues in the current Internet, as does the social principle of separating concerns, which in turn influence how IETF engineers perceive their responsibility for the effects of their protocols on society. One of my research participants drew on the Internet’s modularity to define that responsibility as follows, ‘That is a “SEP”, a ‘Somebody Else’s Problem’ Field’. He said the social implications of his protocols were a SEP as they happened beyond the layer on which he worked. Modularity orients engineers away from considering the social implications of their work, naturalising a way of thinking about the world in which engineers are not expected to consider the social impact of their work. I describe this process in detail in Chapter Seven. To provide a comprehensive picture of the social repercussions spurred by the ARPANET’s technical design, it is important to understand protocols and cover two of the core network protocols developed by its research community.

Protocols

Modularity requires Internet protocols because layers need a shared language to exchange data. This is where protocols come in. In addition to the question of cost reduction, efficiency, and network resilience in the case of war, the ARPANET faced another hurdle: how to connect multiple networks? In effect, the networks on the ARPANET spoke different languages. To address this issue and develop a network *lingua franca* (Abbate 2000, 128), a loosely organised group of researchers formed the Network Working Group (NWG). The ARPANET, through the NWG which later became the IETF, created a network not only of machines but of people (Abbate 2000). These people became friends as they developed a set of informal norms and relationships to manage the development of the network.

These informal norms for cooperation were initially formulated by the NWG in what is now widely known as the Request for Comments (RFC) series. RFCs remain central to the work of the IETF.²³ They set the technical requirements for interoperability and play a crucial role in socialising participants into the cultural finesses of the IETF (Braman 2011b; DeNardis 2009). Likewise, the importance of the human elements of networking is still reflected in current IETF culture and protocol development processes. During a 2017 meeting, the IETF chair mentioned that, ‘It is our community that defines the IETF’. Or, as one of my research participants told me, ‘I love coming to the IETF. The people here are my friends, some of us go back more than 30 years and so do our arguments. We can yell at each other, call out bad engineering in clear terms, and still go for drinks after’. Culturally, the IETF in many ways continues to reflect the pre-commercialisation Internet: a small community of like-minded engineers working towards what they call ‘the good of the Internet’. Their visions for the Internet’s inherent liberatory potential have also stayed remarkably stable and as encoded into the protocol’s original *lingua franca*.

The ARPANET initially relied on the Network Control Program (NCP) to transfer information. In 1973, two researchers in the Defence Advanced Research Projects Agency (DARPA), the research agency of the United States DoD, developed a new protocol that addressed several issues of connectivity when confronted with unreliable physical transport of data and other NCP

²³ In a 2019 publication, Steve Crocker who was part of the NWG remarked that the RFC series, as a governance format that relied on ‘continual improvement by consensus among a coalition of the willing still lives strong in Internet culture’, was an enduring legacy of the decisions made for the ARPANET. The longevity of the decisions made at that time reflects the persistence of its underlying sociotechnical imaginaries for the current Internet. See: <https://web.archive.org/web/20201107171632/https://spectrum.ieee.org/tech-history/cyberspace/todays-internet-still-relies-on-an-arpanetera-protocol-the-request-for-comments>

limitations. They called it the Transmission Control Protocol (TCP).²⁴ TCP enables two hosts to establish a connection and facilitates the reliable delivery of data between them. TCP was expanded with the Internet Protocol (IP), which addresses and routes packets, while TCP ensures their transmission is reliable. In other words, TCP provides a single language that allows computers to connect over the network, while IP enables information to be routed between them.

Layers	Protocols
Application (or process) layer	
Host-to-host layer	TCP
Internet layer	IP
Network interface (or local network layer)	

Figure 2: ARPA Architecture and Protocols

The development of TCP-IP for the ARPANET served four cultural functions. First, it strengthened the bonds between a tight-knit group of technical experts. These bonds helped them develop the first networks through collaboration and their recognition of the mutual benefits of interconnection. This elite group formed a strong sense of community and lasting personal ties.²⁵ Second, the foundational technical principles of these protocols—intelligence at the edges coupled with modularity—also defined how ARPANET was governed. The ARPANET worked because it separated the various tasks involved in routing packets across the network and developed standardised communication protocols without prescribing how individuals should run their networks.²⁶ This ‘non-prescriptive’ governance model suited the cultural context of the universities involved, particularly their dislike of top-down management (Abbate 2000). Third, TCP-IP enabled ARPA to attract private contractors to develop and maintain the network, cementing the role of the private sector in Internet standardisation. Fourth,

²⁴ Initially called the Transmission Control Program, but for clarity’s sake, I will refer to it as Protocol throughout.

²⁵ The endurance of the NWG work, for example, is reflected in the similarities between it and the current IETF, in terms of its people, packets and politics. This endurance continues to surprise its former members (RFC 2555, 4), which include various individuals now in the ‘Internet Hall of Fame’ like Jon Postel, Joyce Reynolds, Stephen Crocker, and Vinton Cerf. See: <https://web.archive.org/web/20210219182822/https://www.internethalloffame.org/>

²⁶ It also worked because Roberts effectively forced academic groups connected to ARPANET into a community dedicated to its functioning (Abbate 2000, 46).

the development of TCP-IP would enable the network to grow organically after the Internet's privatisation, as there was limited central authority gatekeeping connection (Naughton 2016; Zittrain 2008).

These design choices, of modularity and protocols, are often linked to the Internet's ability to foment social progress (Dutton and Peltu 2007; Rogers and Eden 2017, 739). ARPANET's design contains the sociotechnical imaginary of inherent progress arising from the network's development as a set of stacked, but separated, layers connected through protocols. This optimistic vision, however, complicates deeper conversations about how social discrepancies shape the Internet in practice, which recent scholarship shows is deeply impacted by racial and gendered differences (Benjamin 2019a, 2019b; Brock 2020; Eubanks 2018; McIlwain 2019; Nelson 2002; Noble 2018; Thorat 2019). Yet, minimal control, optimism, layered responsibility, and individualism remain important for the networking community at IETF. In my empirical chapters, I explain how these cultural forces affect how human rights advocacy attempts are received in the IETF.

The Science Internet: National science foundation network

Between 1985 and 1995, the United States National Science Foundation (NSF)—a funding agency of the US government focused on science and education—financially supported the creation of the Internet by connecting research and education institutes nationwide. The need for this novel 'network of networks' arose from growing frustration about the exclusiveness of the small group of institutions and individuals involved in the development of ARPANET (Naughton 2016). Unlike the ARPANET, which was only accessible to institutes that had research contracts with ARPA, NSFNET was open to any institute that could pay the annual subscription fees. These new rules meant that the network grew from 2000 connected computers in 1985 to 159,000 in 1989 (Abbate 2000, 186). This network connected as many as one million users spread across universities, private companies, and other organisations.²⁷ Consequently, the need for coordination and governance grew.

Faced with growing demand, the IETF was tasked with coordinating the interactions between these disparate entities. Even though the number of individuals connected to NSFNET increased, the IETF remained an informal, community-oriented group of avid users trying to

²⁷ Because NSFNET also used TCP-IP, ARPANET and NSFNET were able to interconnect. NSFNET eventually became the backbone of ARPANET.

coordinate disparate networks and govern internetworking in its distinctly combative style (Cath 2020). While the Internet is often characterised as decentralised, there are central coordination functions. The ‘rough’ culture that underlies these functions, I will argue in subsequent chapters, directly impacts whose values shape standards design. The explicit role of culture in shaping standards and the specifics of the IETF’s culture—beyond broad and often celebratory accounts of ‘how anarchy works’ (Borsook 1995), ‘where wizards stay up late’ (Hafner and Lyon 1998), and academic work focusing on ‘governance innovation’ (Hofmann 2007; Mueller 2010)—remain scantily theorised. Much of the Internet governance literature covering the IETF, as I will show in the next chapter, overlooks the organisation’s ongoing struggles with structural sexism and the lack of global representation.

In 1990, ARPANET was decommissioned,²⁸ making NSFNET the primary ‘network of networks’. Again, the question of cost reduction arose. In particular, there was an ongoing discussion²⁹ regarding whether the commercialisation of NSFNET could supplant its public funding model. In 1994, NSF decided to allow commercial use, decommission its backbone, and hand over the management of the backbone to private companies called Internet Service Providers (ISPs). The individuals involved in building NSFNET saw its commercialisation—as in its initial design—as serving particular cultural functions expressed through their preference for decentralised and market-based network development. This decision reflects the complementary logics of modularity and free market-based technology development.³⁰

Taken together, it is not merely the existing technology that predestines the shape of the Internet. Its design and governance are heavily influenced by the cultural demands of the people who built it, the politics of its funding, the logic of free-market-based economies, and the accompanying limited concern for justice and equity.

²⁸ Most ARPANET users are unlikely to have noticed much of the eventual commercialisation of the ARPANET, yet some closely involved did mark the occasion. Vint Cerf, one of the co-designers of TCP-IP and ARPA employee, marked it in a ‘requiem for the ARPANET’ (Cerf in Abbate 2000, 195).

²⁹ The transition of the NSFNET to the private sector was, as Naughton (2016, 12) argues, not preordained, ‘The eventual outcome of the NSF’s handover of the network to private interests was a product of judgement, foresight, consultation, political astuteness, luck, and timing’. The discussion, as captured in RFC 1192, suggests that a broad number of options were considered. See: RFC 1192. *Commercialization of the Internet Summary Report*. Brian Kahin. <https://tools.ietf.org/html/rfc1192>. November 1990.

³⁰ The decision to commercialise has to be understood from the vantage point of United States politics in the 1990s, where there was a dislike for government involvement in commerce (Abbate 2000, 195).

The Mainstream Internet

The early pre-Internet networks were mostly open to a tight-knit community of researchers, private contractors, and government employees. This insularity is reflected in the networks' governance and culture. In the first decade after the Internet's commercialisation, this culture changed, since it was no longer made up of a small circle of familiar faces. The community involved in developing the Internet was faced with various new issues arising from its growth, including spam, viruses, and security necessary for e-commerce.

Following its commercialisation, the Internet's governance model further evolved. Most notably, many of the relatively informal governance arrangements developed into more established organisations. For example, the IETF, which had until that time functioned as an informal group of expert enthusiasts, became an official activity of the Internet Society (ISOC) in 1992. Likewise, in 1998 the Internet Assigned Names and Numbers Authority (IANA)³¹ was folded into a new organisation responsible for the administration of Internet names and numbers: the Internet Corporation of Assigned Names and Numbers (ICANN). The creation of ICANN shifted the oversight of the IANA functions to the United States government, representing a significant transition from IANA functioning under the auspices of two dedicated IETF individuals³² to a United States government-contracted oversight scheme.

The mainstream Internet era saw important technological breakthroughs, most notably the development of a second 'killer protocol' after TCP-IP: the World Wide Web (WWW). The web was developed in 1989 by Tim Berners-Lee³³, a scientist working at the European Organisation for Nuclear Research (CERN), to facilitate knowledge exchange between scientists within CERN using hypertext.³⁴ The latter technology already existed, but Berners-Lee took the

³¹ IANA coordinates the unique identifiers that connect Internet names to Internet numbers. For more information, see: <https://web.archive.org/web/20201115222159/https://www.icann.org/en/system/files/files/functions-basics-07apr14-en.pdf>

³² Until that time, the crucial work of maintaining the databases related to the Internet's namespaces was done by two people: Jon Postel and Joyce Reynolds. As the network was small and most of the members knew each other, the numerical system for connecting URLs to IP addresses ran on trust between the members and the diligent notebook documenting practices of Jon and Joyce. See also: RFC 2468. *I Remember IANA*. Vint Cerf. <https://tools.ietf.org/html/rfc2468>. October 1998.

³³ Berners-Lee's bosses were not immediately excited by his idea, which he wrote up in a proposal entitled 'information management, a proposal'. They famously returned the draft with the comments 'Vague, but exciting'. For more information see: <https://web.archive.org/web/20201231072428/http://info.cern.ch/Proposal.html>

³⁴ Before the creation of the World Wide Web, hypertext was already in use. The original idea for hypertext is often traced back to 1945 when Vannevar Bush, an American engineer educated at MIT and often credited for the creation of the NSF, wrote an article in *The Atlantic* entitled 'As We May Think'. In it, he outlined his vision for the future of networked technology. Many of his statements regarding the future of technology materialised in

software and made it enable more user-friendly for information exchange across the Internet.³⁵ To facilitate this exchange, he developed multiple protocols, including the Hypertext Transfer Protocol (HTTP) and Uniform Resource Locators (URL). Both of these protocols remain crucial to the modern-day functioning of the Internet and are further developed in the IETF.

These technical and political developments led some of the Internet's governance to become encapsulated in formalised coordinating bodies. Yet, as my dissertation shows, throughout these organisational changes the IETF maintained its distinct culture, techno-optimistic sociotechnical imaginaries, and modular coordination-based governance model.

The Modern Internet: Oh well, we tried.

The last decade has seen the proliferation of a wide variety of Internet applications, including search engines and social media. The spread of these commercial applications introduces a new set of norms for the development of the Internet. Rather than being focused on interoperability and coordination, these apps are based on proprietary closed software. They employ a 'walled-garden' economic model that, rather than allowing interoperability with other apps, deliberately keeps users on the platform. Jonathan Zittrain published his book *The Future of the Internet and How to Stop It* in 2008, in which he outlines these trends towards commercialisation and closure. A decade after, he remarked that if he were to write a sequel now, the subtitle would be: 'Oh well, we tried'.³⁶

This commercial and closed-source shift has had a profound impact on the Internet and its governance. The consolidation³⁷ of power in the hands of social media, information retrieval, and

the Internet's development.

<https://web.archive.org/web/20210316134638/https://www.theatlantic.com/magazine/archive/1945/07/as-we-may-think/303881/>

³⁵ Colloquially, most everyday users conflate the Internet with the world wide web. It is, however, important to stress that the Internet provides the infrastructure that allows networks across the world to interconnect. The web is an application that runs on top of the Internet, providing a user-friendly interface for information exchange.

³⁶ For the tweet from which this section's header draws see:

<https://web.archive.org/web/20190228203757/https://twitter.com/zittrain/status/1069974611331375105>

³⁷ Internet governance academics and practitioners alike remain concerned about the potential negative effects of consolidation on the Internet. In March of 2018, the Internet Architecture Board (IAB)—which provides architectural oversight of IETF activities and protocols—published a blog on the impact of consolidation on the network, particularly on Internet traffic flows. In early 2019, the Internet Society (ISOC) published an interview with the previous IETF chair Dr. Cooper on how consolidation affects (and occurs in) the IETF. She provided a description of the issues of consolidation in terms of market monopolies, industry perspectives on the merit of open-source solutions, and accessibility to the standardisation process. For the entire interview see:

<https://web.archive.org/web/20210308223728/https://www.internetsociety.org/blog/2019/02/future-thinking-alissa-cooper-technical-impact-internet-consolidation/>

browser companies changes the market incentives that drive the need for cooperation and interoperability through standards. This consolidation trend has been considered in terms of impact on the ‘platformisation of the web’ (Helmond 2015) and platform governance (Gillespie 2010, 2018; Gorwa 2019). But in recent years, the IETF is also explicitly considering the implications of consolidation for standard development and Internet infrastructure.³⁸

Most of these consolidation developments have not yet changed how the IETF develops protocols but do influence which companies and market incentives sway design decisions. Internetworking protocols remain focused on fomenting interoperability and global application. IETF engineers are largely driven by this technical aim as well as by a myriad of economic drivers, not least of which are those that generate income for their employers. For an idea to be developed in the IETF, it needs to have buy-in from the biggest market players before it would be considered. Many participants told me they were worried about this trend because it put power over protocols in the hands of an increasingly small group of companies. These changing dynamics further emphasise the close connection between the social and technical functions of the Internet, which remain intimately intertwined in the modern-day Internet.

This close link is also visible in recent political developments around Internet-based surveillance. Over the last decade or so, there has been a particular concern with privacy from government surveillance spurred on by the ‘Snowden revelations’. Edward Snowden was a contractor for the United States government’s National Security Agency (NSA) who in 2013 released documents with information about extensive government surveillance. In response to these revelations, the IETF wrote a consensus document outlining surveillance as ‘an attack on the network’.³⁹ In it, the organisation reaffirms its commitment not to cooperate with governments’ requests to build surveillance functionalities into the network. Yet, such collective responses in the face of corporate surveillance or consolidation have been largely absent.

³⁸ For further details, see this blog authored by IETF leadership on consolidation <https://web.archive.org/web/20210308152307/https://www.ietf.org/blog/consolidation/> as well as this academic article published by one of the IETF’s former chairs: Arkko, Jari. 2020. ‘The Influence of Internet Architecture on Centralised versus Distributed Internet Services’. *Journal of Cyber Policy* 5 (1): 30-45. <https://doi.org/10.1080/23738871.2020.1740753>.

³⁹ See here for this document: RFC 7258. Pervasive Monitoring is an Attack. Stephen Farrell and Hannes Tschofenig. <https://tools.ietf.org/html/rfc7258>. May 2014. I will elaborate on its cultural significance in my empirical chapters.

Some academics take this pro-privacy stance as a signal of the IETF's important role in proactively protecting human rights (Rachovitsa 2016a, 2016b). I argue instead that this development reflects the IETF's vision of the Internet as a space for unfettered individualism, in which its engineers respond to those threats to protect their politics and imaginaries, rather than a broad commitment to human rights. However, throughout the Internet's development, there were small pockets of engineers and computer scientists—as well as civil society organisations—who tried to advocate for rights and broader societal change through technology.

2.3 Advocacy in the Computing and Internet Industry

There has consistently been rights advocacy—or 'the process of identifying with and representing a person's view and concerns, to secure enhanced rights and entitlements' (Henderson and Pochin 2001, 1)—inside the computing and Internet industry. Even if not amongst its principal architects. Civil society organisations have been founded with the Internet as the kernel of their mandate. By this reading, the history of the Internet is also a history of civil society advocacy. This raises the question of how the imaginaries fuelling the Internet's development affect the work of these advocacy organisations and individuals to influence the Internet's infrastructure.

In this section, I will briefly trace the history of advocacy, including on human rights issues, in communities involved in developing the Internet, broadly following the historical timeline above. I will show that such advocacy is a feature, not a bug of Internet governance, but that the most vocal individuals advocating for change are primarily focused on a limited number of social concerns. This insight, in turn, allows me to place my case study in a lineage of technology advocacy and extrapolate my findings of the sociotechnical imaginaries as partial to the broader civil society sector working on Internet governance issues.

The companies and organisations governing the modern Internet, like its predecessors, have become both a site for and a cause of civil society advocacy. Before policymakers and industry engaged in Internet governance, civil society organisations had already recognised it as a relevant forum (Brousseau, Marzouki, and Méadel 2012b, 372). Civil society has long been a minority participant in Internet governance debates. Multiple Non-Governmental Organisations (NGOs), even those not founded with the Internet in mind, now engage in advocacy that targets the companies and individuals developing Internet technologies (Cath 2015; Cath and Floridi 2017;

Hintz and Milan 2009; Milan 2014; Milan and Ten Oever 2016; Myers-West 2017; Ten Oever 2020a, 2020c). Such advocacy efforts are a lesser known, but growing part, of the overall dynamics through which the Internet is developed and governed.

The Internet, as I described above, is the result of technological communities of practice coming together, exchanging knowledge, and networking their minds *and* machines. On occasion, this exchange includes heated debates about the societal impact of networked technologies (Abbate 2000; Braman 2011b; DeNardis 2012, 2013; Morris 2011; Musiani et al. 2015). Following the Second World War, some science labs, including those working on networking technologies, were at the forefront of advocacy efforts. They especially agitated against the growth of military-science ties (Moore 2013). The cultural link between science labs and the IETF is close, as some of the engineers involved in the labs developing the Internet and its predecessors only recently retired from standards' development at the IETF.⁴⁰ In her work on the nature of the early conversations of those involved in building the ARPANET, Braman (2011a, 2011b, 2012, 2013, 2017) shows that these engineers discuss a plethora of social concerns like privacy, property rights, and environmental impacts.

Advocacy on behalf of social concerns are important cultural facets predating the commercialisation of the Internet. Principally among the critical voices was 'Computer People for Peace', a national network founded in 1968 by computer programmers concerned about the social implications of their work (Greenbaum 2020). They published informational pamphlets, raised concerns surrounding the use of technology for war, and tried to unionise technology workers. Another well-known example is the 'Computer Professionals for Social Responsibility' (CPSR) organisation, founded in the early 1980s in response to military applications of software (Finn and Dupont 20). This excerpt from a 1986 New York Times article about a new ballistic missile defence system includes a comprehensive articulation of CPSR's concerns:

(...) flaws in the software might cause a highly automated Star Wars system to fire by mistake at a harmless target, perhaps triggering a crisis that could escking [sic] toward late to nuclear holocaust [sic]. There is also the fear that the computer programs would be vulnerable to sabotage, espionage and even hostile takeovers by Soviet masterminds, who

⁴⁰ All of the IETF meetings I have attended included moments during their plenary meeting to thank contributing members who were retiring from the IETF. Often, their track records spanned beyond the IETF and into the science labs at MIT and other universities involved in the early Internet. Sometimes, it was not the end of their professional career, but rather their deaths that spurred their "retirement" from the IETF.

might penetrate the software electronically, take control of it and turn the system to their own uses.⁴¹

The article's focus on the Soviet threat reflects the time-period, yet its underlying concerns regarding the political use of software seem prescient. There are now many debates about the adverse effects of software on society and the use of the Internet's infrastructure for political ends (Acker and Donovan 2019; Cath and Floridi 2017; Deibert et al. 2008; DeNardis 2009, 2011, 2014, 2020; Dencik, Hintz, and Cable 2016; Gillespie et al. 2020; Ten Oever 2020a; Wright 2012; Wright, Darer and Farnan 2018). CSPR also publicised their objections regarding the responsible use of new technologies and advocated for online privacy and community networks. CSPR spurred the creation of NGOs like the Electronic Privacy Information Centre (EPIC), which continues to operate today.

Since the Internet's commercialisation, such civil society organisations have proliferated, developing programs at the intersection of human rights and networked digital technologies. One obvious example is the Electronic Frontier Foundation (EFF), founded in 1990. This NGO focuses on the protection of Internet civil liberties through a combination of legal and technical work, including participation in Internet standardisation. Yet, this NGO also exemplifies how the individualistic vision of the Internet's architects' functions in contemporary Internet advocacy. April Glaser, a technology journalist and former EFF employee, explains that an individualistic vision is central to this NGO. She argues that a focus on civil liberties—often articulated as the right to individual freedoms and protection from government overreach—has left many digital rights advocates with an 'incomplete vision' (Glaser 2018). By this reading, advocates in NGOs are focused on individual liberty at the expense of collective concerns.

Several authors considering these NGO efforts similarly argue that their work promotes a particular and limited vision of change. Technology, not people, is mistakenly seen as a tool to advance political goals like social justice, anti-discrimination, and human rights (Gangadharan and Niklas 2019; Myers-West 2021; Paris 2020). These academics describe this advocacy approach as 'tech essentialist' (Cohen 2019, 4; Myers-West 2021,9)—bestowing the power for societal change on technology, rather than on the people that build it. Directing their efforts towards technology inherently comes up short, as these NGOs reaffirm the importance of niche

⁴¹ For the full article, see:
<https://web.archive.org/web/20191115013357/https://www.nytimes.com/1986/09/16/science/software-seen-as-obstacle-in-developing-star-wars.html>

technical skills for fomenting societal change. Their work also overlooks how the outcomes of technology are contingent on social, economic, cultural and political conditions. Throughout my work, I show how the choices of human rights advocates in the IETF, captured in their tech-essentialist orientation towards technology, hinder their efforts.

This brief history of advocacy in the computing and Internet suggests that there is a persistent engagement of a small group of concerned professionals both within and outside of the computing and Internet industry. Yet, their visions still seem largely aligned with those of the Internet's architects; they focus on individual liberty and freedoms, and less on collective justice and rights. Without diminishing the role these advocates played in changing how software was developed or applied—or making questions of social responsibility part of the larger discussions about professional responsibility of computing communities—it is important to consider whose concerns are not included through their work.

Recent research indicates that a number of concerns are not adequately addressed through historical, and current, advocacy efforts aimed at improving Internet infrastructure to meet public demands. For example, the concerns of blue-collar workers get less corporate and journalistic traction (Tarnoff 2019). Likewise, when advocates representing communities of colour participate in telecommunications' policy debates, their voices are often drowned out by their white counterparts (Moran and Bui 2019). It is not uncommon for civil society advocates to be marginalised within Internet governance processes, as their concerns and resources are often outmatched by powerful corporate and state actors (Brousseau, Marzouki, and Méadel 2012a; Carr 2015). This gap between the tenacity of advocacy efforts and their long-term impact on Internet governance emphasises the need for ethnographic research on the specific factors shaping the inclusion of advocates' concerns. Below I will discuss these issues as they pertain to the IETF.

Similar to the scientific community and computing industry, there is an active culture of internal advocacy in the IETF. As I will show in Chapter Five on IETF culture, it is encouraged by its cultural practices of individual participation and confrontation. The IETF has a track record of civil society participation and is an active participant in societal debates about security, privacy, and (recently) human rights (Braman 2011b; Cath and Floridi 2017; DeNardis 2009; Morris and Davidson 2003; Rachovitsa 2016a; Ten Oever 2020). Concerns around government surveillance and privacy abuses by governments are a particularly active part of contemporary debates in the

IETF (DeNardis 2009; Rachovitsa 2016b). Simultaneously, these discussions are often framed within existing, narrow technical concerns (Cath and Floridi 2017) that omit structural critique of the imbrication of Internet infrastructure with broader rights and equity considerations.

I argue that the IETF's narrow technocratic focus shapes its limited willingness to engage with a broad set of social concerns. This narrow focus is reflected in recent research on the IETF. Braman (2011a, 2011b), for example, considers how IETF engineers dealt with political issues that arose in their work. She explains how they use their technical document series to address social and political problems through limited engineering solutions. Dave Clark (2018) similarly describes how the IETF conceptualises the network as serving a wide array of users and usages. He focuses on the various technical implications of different design options. However, he elides the social dynamics that undergird the technology the engineers *choose to create*.⁴²

There is room for further research that looks beyond the technocratic approach of IETF engineers to social and political questions and ask why only particular social concerns—like privacy—seem to get structural attention. My approach considers to what extent human rights advocates are able to shape the Internet and encourage its architects to account for broader rights and justice concerns, not naturally represented within their ranks.

Over the past two decades, multiple individuals from civil liberties organisations joined IETF working groups to advocate for broader 'protocol policy impact assessments' (Morris 2011; Morris and Davidson 2003), cultural change within the organisation (Ten Oever 2020a), and individual technical fixes to particular protocols. These advocates are often successful in addressing the third cause, but not the former two. I will argue throughout my dissertation that political approaches, rather than technical fixes, are unsuccessful because broader social impact assessments (whether for privacy, policy, or human rights) and cultural changes require a fundamental social shift in how IETF participants view the Internet. Individual fixes within the

⁴² This cursive text refers to the following quote from RFC 3935 which contains a 'Mission Statement for the IETF'. It states: 'The Internet isn't value-neutral, and neither is the IETF. We want the Internet to be useful for communities that share our commitment to openness and fairness. (...) These concepts have little to do with the technology that's possible, and much to do with the technology that we choose to create'. The philosophy behind this quote, that IETF engineers have social and political preferences that guide their technical design of the Internet, is a leitmotif throughout this dissertation. It is also the title of Chapter Seven, in which I discuss the sociotechnical imaginaries that guide IETF engineers' understanding of professional responsibility. For the full RFC, see: RFC 3935. *A Mission Statement for the IETF*. Harald Alvestrand. <https://tools.ietf.org/html/rfc3935>. October 2004.

often-protracted nature of protocol development primarily require technical acumen, social networks, commercial incentives, and patience. Broader scale consideration of human rights in standardisation therefore requires the organisation to adjust its imaginary of the Internet and its protocols, which its engineers are largely unwilling to do.

The IETF largely refuses to make these imaginative and cultural changes. I argue that their reluctance to change suggests that IETF's culture and sociotechnical imaginaries steer which social functions and politics are included in protocol development. But the human rights efforts are also influenced by the advocates' 'tech essentialist' approach, which largely mirrors the IETF's ethos of reducing political choices to engineering problems. Like other academics considering advocacy within the technology industry (Carr 2015; Dunbar-Hester 2019; Green 2019a; Greene, Hoffman, and Stark 2018; Myers-West 2017; Tarnoff 2019), I found that civil society efforts become entangled in the social dynamics of engineering culture and its sociotechnical imaginaries, often to the detriment of the inclusion of novel values and voices.

2.4 Conclusion

In this historical overview, I contextualised my case study by providing a brief background to the Internet's development. This chapter presented an argument that humans, and the cultural demands they put upon the network, shape the Internet's technical design and governance model. The culture guiding early Internet governance and its central tenets—modularity, distributed responsibility, and laissez-faire development—have remained remarkably stable over the last seven decades, including within the IETF today. That is, the sociotechnical imaginary of techno-optimism based on unspecified growth and connectivity, rather than directed engagement with societal inequity, fuelling the Internet's development remains stable. I indicate how this imaginary is shared by a varied set of actors—primarily governments, private companies, and researchers but also by civil society advocates—who were crucial to the Internet's development.

For much of the Internet's history, this partial vision has guided the advocacy efforts of NGOs and civil society, especially those with digital rights mandates. The human rights advocacy efforts at the heart of this ethnographic case study fail to represent a break from that tradition. This imaginary is anchored in a view of the Internet as a tool for social progress and comes to fruition through the architects' interest in promoting individualistic development while protecting civil

liberties. This imaginary of the Internet as an inherent tool for social progress is a fundamentally partial one—that leaves many questions of rights and justice unanswered. The political implications of this vision are especially concerning, given recent research on the rights-eroding impact of the Internet on society, particularly its impact on minorities and communities of colour.

The closely connected social and technical functions of Internet governance help us understand current debates in the IETF about human rights. These debates are informed by shared cultural visions and collective behaviour that preclude in-depth considerations of the (corporate) responsibility of protocol engineers, in part to maintain the Internet’s modular design. Some academics have argued that ‘the successful expansion of the Internet, while accommodating many unexpected and often dramatic innovations in technologies and applications, is a testament to the success of this design foundation’ (Dutton and Peltu 2007, 15). In this chapter, I took a different approach by arguing that the permanency of the Internet’s design foundation is, in many ways, a testament to its architects’ narrow definition of success.

In this historical chapter, I have put forward an argument that the Internet consists of cultural norms and values as much as it does bits and bytes. In fact, cleanly separating the Internet’s social from technical functions remains difficult. This link between the social and technical demands architects put on the network reveals the agency of technologists in steering what societal functions the network does, or does not, fulfil. As I show in the next chapter, the intertwined relationship between these social and technical functions of Internet infrastructure raises questions for recent academic theorising about Internet governance. In particular, it motivates new research puzzles regarding what can be known about the Internet, the use of its infrastructure, and the role of human rights advocacy in its governance.

3. Moving Towards Critical Internet Governance

3.1 Introduction

Internet governance is social as much as it is technical, and it is shaped through everyday cultural work. In this chapter, I introduce my analytical framework of critical Internet governance. I outline the interventions my framework makes in Internet governance debates about engineering culture, human rights advocacy efforts in the Internet Engineering Task Force (IETF), and the political use of Internet infrastructure by applying theories (and methodologies) from anthropology. I draw from existing Internet governance and anthropology research to illustrate the close relationship between the ‘social and technical functions’ (DeNardis and Musiani 2015, 3) of Internet governance and to argue that further cultural analysis of the Internet is needed to illustrate the human bits of its infrastructure.

My anthropological consideration of the connection between culture and code has direct implications for current debates in Internet governance. This literature review chapter highlights the affective aspects of Internet governance that have so far not been studied extensively. By affective I mean the emotions, sense of personal commitment, pride, frustrations, and fun as well as the social behaviours that guide Internet governance discussions below the technical jargon. I apply my analytical framework to demonstrate what is missing from the current literature on IETF culture and human rights advocacy. I focus on the lack of cultural depth of the insights into protocol politics and IETF imaginaries that animate the rejection of the human rights interventions central to my case study.

My work unsettles the fundamental assumptions of one of the main contemporary theories of Internet governance research, called the ‘turn to the infrastructure in Internet governance’ (DeNardis and Musiani 2015, Musiani et al. 2015). This theory holds that the Internet’s infrastructure has a set of stable and ‘original technical and policy functions’ (DeNardis and Musiani 2015, 3) that are being co-opted for political ends. I argue this theory is overly deterministic, foregoing consideration of how culturally contingent ‘sociotechnical imaginaries’ (Jasanoff 2015) shape these Internet governance functions. However, before moving to those debates, I want to ground my main analytical concepts including Internet governance, culture, and sociotechnical imaginary.

I understand Internet governance as the ‘reflexive coordination’ (Hofmann, Katzenbach, and Gollatz 2017, 1) needed to organise the myriad of routine practices involved in maintaining the

Internet. Following this definition of Internet governance enables me to capture the ‘emergent orders prevalent in rule-making in digital contexts and to include the practices of Internet users, providers, and other stakeholders as Internet governance’ (Hofmann, Katzenbach, and Gollatz 2017, 8). It also allows me to question whether these practices lead to governance innovation, as some academics argue (Hofmann 2007; Mueller 2010) and expand on what Internet governance research should entail.

In this definition, ‘governance practices’ rarely encompasses anthropological insights about Internet governance cultures. Such insights into culture are needed to fully theorise Internet governance (Scholte 2020). My dissertation illustrates the importance of interpersonal relations and collective social behaviour to explain how values and politics become embedded in the Internet’s infrastructure. I provide qualitative insights that enrich the knowledge of Internet governance by undertaking a detailed study of *the role that IETF culture plays in its infrastructural politics*, through a case study of human rights advocacy within this Internet standards-setting organisation.

‘Culture’ has a specific meaning in the context of this research. As mentioned in the introduction chapter, I define culture as ‘a fuzzy set of basic assumptions and values, orientations to life, beliefs, policies, procedures and behavioural conventions that are shared by a group of people, and that influence (but do not determine) each member’s behaviour and his/her interpretations of the ‘meaning’ of other people’s behaviour’ (Spencer-Oatey 2008, 3). I do not, however, approach culture as a singular object or afford it stable explanatory power. Rather, like Nick Seaver (2017, 4), I take cultural analysis to involve researching constantly changing practices and social relations, ‘Rather than a setting for actions, culture might be something people do—an outcome of actions. This multiplies culture radically: instead of unified “cultures”, we have an array of loosely coordinated practices that compete and collaborate, sometimes for “cultural” goals and sometimes for other goals—for instance, “technical” ones.’ Such a practice-oriented approach to studying culture (Abu-Lughod 1991) maps on to the Internet’s layered design, which is produced through a loosely coordinated set of networks and defined through evolving human protocols in organisations such as the IETF.

To connect the IETF’s cultural visions to its engineering practices, I apply Jasanoff’s notion of the ‘sociotechnical imaginary’ (2015). As mentioned in previous chapters, sociotechnical imaginaries are ‘collectively held and performed visions of desirable futures, animated by shared

understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology' (Jassanof 2015, 5). As my description of the IETF's collective conceptualisation of the Internet and its protocols will show, imaginaries of this kind exert considerable material power. I perceive the force of that power to reside within the designers' shared moral and technological order of the Internet and their ability to shape its infrastructure such that it enacts that order (Kelty 2008, 28). Throughout my dissertation, I illustrate the powerful effects of such shared orders and their ability to shape the Internet's material infrastructure to include, or exclude, pressing political concerns of rights and justice. I do so by demonstrating how the particularities of the IETF's culture and imaginaries have adverse consequences for ongoing human rights advocacy efforts.

This chapter proceeds as follows. First, I provide a brief overview of international *Human Rights Law* necessary to understand the values and aims pursued by the advocates in my case study, as well as the legal and political limitations of their work. After which, I analyse the three most recent phases of Internet governance research for the limited critical and ethnographic work on power and governance cultures. I use this literature review to introduce my analytical framework of *Critical Internet Governance*. I argue that we are currently entering a fourth research phase in which Internet governance academics will need to expand their disciplinary reach to develop further insights into how Internet governance cultures further power dynamics to the benefit of their most privileged participants.

Subsequently, I add to three current discussions in Internet governance that are directly relevant to my case study: the lived reality of *IETF Culture*, what it means to do *Human Rights Advocacy* work in Internet governance, and the theoretical limitations of the *Turn to the Infrastructure*. My analytical framework draws together these three disparate pieces of literature by undertaking critical anthropological research on Internet governance. My subsequent empirical chapters map onto these latter three literature reviews (see Appendix I). I *Conclude* by demonstrating how anthropology can provide novel insights into Internet governance debates by foregrounding the quiet, but powerful, normative force of the cultures and mundane practices that shape governance-making bodies and processes.

3.2 Human Rights Law for Corporate Accountability

Human rights are key to this dissertation. Here, I will provide a short background on the limits of using the international framework of human rights to hold Internet companies to account. I follow the definition of human rights as set out by my research participants. They defined these rights as rooted in its international framework. I start with a short background of human rights-based advocacy followed by an outline of the main critiques of the international framework of human rights as captured in recent academic, political, and legal debates. After which, I explain why the IETF advocates chose to focus on international human rights and state the limitations of their subsequent approach, by considering the gaps in their theories of change and the lack of binding human rights obligations on the private sector.

In my empirical chapters, I build on the known legal limitations of the human rights framework when applied to non-state actors. I add a variety of cultural hurdles of using this international legal framework for advocacy purposes aimed at holding the tech sector to account.⁴³ I demonstrate that the IETF does not structurally consider the impact of its work on human rights, even though some of its most prolific corporate contributors have publicly committed to these values. I use this contradiction to consider additional mechanisms for scrutinising Internet governance and the development of legally binding human rights tools beyond the existing frameworks introduced in this section.

A Brief History: Encoding international human rights in law

The 1948 adoption of the Universal Declaration of Human Rights (UDHR) by the United Nations (UN) accelerated human rights-based civil society advocacy (Nelson and Dorsey 2008). Human rights, like protocols for the Internet (see Chapter Two), have been described as the global ‘ethical lingua franca’ (Langford 2018, 71; Tasioulas 2007, 75) for such advocacy efforts. The UDHR and the UN’s human rights conventions set out the duties and responsibilities of States vis-à-vis human rights by forming organisations to govern adherence to international human rights.⁴⁴ The body of law that originates from the UDHR primarily codifies State

⁴³ I focus on human rights within the international framework, rather than on regional or national systems. I made this choice because the international framework was crucial to the advocates’ efforts and subsequent push-back on the inclusion of human rights values by IETF engineers. There are many relevant discussions about how international standardisation efforts can be made compliant with regional or local human rights efforts. However, these are out of scope for this work.

⁴⁴ Including the nine core multilateral treaties: International Covenant on Civil and Political Rights (ICCPR), International Covenant on Economic, Social and Cultural Rights (ICESCR), International Convention on the

obligations to protect, respect, and fulfil human rights. States are expected to follow these obligations and duties outlined in international human rights law. These requirements are captured in treaty law as well as customary law and advanced through declarations and principles adopted in international forums. When States ratify human rights treaties, they are required to ensure their national laws adhere to international human rights standards. If they fail to uphold their human rights commitments, injured parties can seek redress through local and international human rights mechanisms, like courts.

This framework of human rights is not without its critics. Within human rights scholarship, there is limited academic consensus on the genealogy of human rights and by extension the legitimacy of its framework's claims to universality⁴⁵ (Alston 2017; Hopgood 2013; Hunt 2008; Jensen 2017; Langford 2018; Moyn 2018). Some academics argue that these debates represent 'a struggle for the soul of the human rights movement' (Alston 2013, 277). Since the early 1970s, critiques of human rights have focused on human rights efficacy, legitimacy, and Western perspective. Critics have also suggested that human rights lack sensitivity to feminist concerns and global inequality (Binion 1995; Engle 1992; Mende 2019; Moyn 2018; Tharoor 1999). The perceived inability of the current human rights framework to address questions of social (in)justice and economic parity is central to many post-colonial and feminist critiques (Binion 1995; Mutua 2013; Spivak 2005). From these perspectives, human rights sustain inequality rather than alleviate it as the international framework is unable to address the social and economic drivers that underpin inequities in the ability to exercise one's rights.

Over the last decade, the relevance of human rights has been questioned by States, the very actor tasked with upholding these rights. The efficacy of human rights advocates is limited by 'the shrinking space for civil society' (Alston 2017, 5), which sees advocates' work increasingly under

Elimination of All Forms of Racial Discrimination (ICERD), Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (CAT), Convention on the Rights of the Child (CRC), International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families (ICRMW), International Convention for the Protection of All Persons from Enforced Disappearance (CED), Convention on the Rights of Persons with Disabilities (CRPD). This legal framework is supported by a 'dense set of international institutions, with policymaking and monitoring bodies, prominent regional human rights courts, and roving UN special rapporteurs, all of which are targeted and promoted by a transnational network of civil society actors driving new standards, carrying out fact-finding missions, and mobilising victims to use international mechanisms' (Langford 2018, 71).

⁴⁵ The principle of the universality of human rights refers to a cornerstone of international human rights law which holds that all humans are equally entitled to their human rights and that such rights are inalienable. See also this UN explainer: <https://web.archive.org/web/20210227160833/https://www.ohchr.org/en/issues/pages/whatarehumanrights.aspx>

political and financial pressure. This situation is aggravated by the waning international commitment of States to uphold human rights. Human rights, however, remain an important vernacular for civil society—from small local social movements to global human rights organisations—to frame their concerns and demands. Human rights advocates and civil society organisations play a key role in monitoring human rights situations and holding States to account at the national and international level (Nelson and Dorsey 2008). In addition to this civil society led monitoring, the UN uses institutional mechanisms to track state compliance with human rights obligations. This system functions through a combination of international and local monitoring, for which the UN again relies heavily on the input of civil society organisations and individual human rights advocates to oversee compliance with its mechanisms.

Such monitoring, however, does not usually involve civil society working directly alongside corporate engineers in Internet governance organisations—as the human rights advocates in my case study do. This lack of direct engagement with the private sector stems from the statist nature of the international human rights framework. The framework, as outlined above, provides limited obligations for non-state actors, but this is changing. The growing importance and power of non-state actors, like ‘Big Tech’, requires new tools to address corporate human rights responsibilities (Jørgensen 2006; Zalnieriute and Milan 2019). Initially, this gap was filled through self-regulation and industry-driven Corporate Social Responsibility (CSR) initiatives. Yet, these initiatives have been fragmented and have failed to alleviate the growing pressure exerted by civil society for corporate human rights guidelines.

Against this backdrop, the UN developed dedicated guidelines for business and human rights, yet their non-binding nature means their impact is limited. In 2008, the UN adopted the ‘Protect, Respect, and Remedy Framework’¹⁶ for business and human rights. This framework outlines the human rights obligations of States and corporations under international law (Addo 2014). In 2011, the UN adopted the ‘UN Guiding Principles on Business and Human Rights’,¹⁷ which built on the 2008 framework. These principles provide an authoritative standard for corporate responsibility to protect human rights. Taken together, the principles are known as the UN

¹⁶ United Nations Human Rights Council (UNHRC). (2008). Protect, respect and remedy: A framework for business and human rights (7 April 2008) A/HRC/8/5 See also: https://www.ohchr.org/documents/publications/guidingprinciplesbusinesshr_en.pdf

¹⁷ United Nations Human Rights Council (UNHRC). (2011). Resolution 17/4: Human rights and transnational corporations and other business enterprises (6 July 2011) A/HRC/RES/17/4. See also: https://web.archive.org/web/20201121050047/https://ap.ohchr.org/documents/dpage_e.aspx?si=A/HRC/RES/17/4

Framework on Business and Human Rights. The framework consists of three pillars: 1) the state duty to *protect* human rights, 2) the corporate responsibility to *respect* human rights, and 3) *access* to remedy for victims of human rights harms. These three pillars contain 31 principles that detail the human rights duties and responsibilities of States and companies to mitigate and address the negative effects of corporate action.

The UN framework on Business and Human Rights is non-binding. It was co-sponsored by the United States government and developed by an expert team led by Harvard Professor John Ruggie. This framework for business and human rights, also referred to as the ‘Ruggie Principles’, does not create new legally binding obligations. Rather, the principles’ normative force emerges from endorsement by States, companies, and other stakeholders and derives legitimacy from their incorporation in binding laws (Ruggie 2017). At last count, 25 countries have published, and 17 countries are developing, the National Action Plans (NAPs) that support the development of national laws on business and human rights.⁴⁸ These plans outline the arrangements and expectations between the State and the private sector regarding the human rights impact of business decisions.

In principle, the Ruggie framework seeks to rectify an earlier oversight by stipulating the human rights obligations of companies. Yet, in practice many companies, including those that have publicly committed to these principles, act in ways that are discordant with the duties and responsibilities outlined in the Ruggie Principles. The human rights commitments made by Internet infrastructure companies are particularly relevant to this dissertation. Multiple companies operating in the IETF explicitly mention their commitment to include human rights in their business practices. These companies include six out of the ten most prolific IETF contributors: Cisco, Ericsson, International Business Machines Corporation (IBM), Microsoft, Google, and Nokia. During my fieldwork, I found that some of the participants in the IETF’s human rights efforts work for these companies, but they do not connect their companies’ commitments to these internal efforts. Others working for these rights-committed companies even actively resist the development of human rights considerations for standardisation in the IETF.

My work makes such tensions between corporate commitment and engineering practice visible. I demonstrate how these tensions are guided by the IETF’s sociotechnical imaginaries of human

⁴⁸ For further information, see: <https://web.archive.org/web/20210319135617/https://globalnaps.org/#>

rights as statist and protocols as non-prescriptive—the shared vision that its engineers cannot and should not prescribe how technology is used, including in terms of human rights concerns. I illustrate how these imaginaries provide an ongoing barrier to considering human rights in the context of the IETF. I argue these insights demonstrate the need for increased institutional scrutiny of Internet governance beyond what can be offered by small collectives of public interest representatives working in Internet governance alongside corporate engineers.

Beyond the wavering commitment of companies to putting the Ruggie Principles to practice, the human rights advocates I studied are also hindered by their specific advocacy approach. I demonstrate the advocates' approach is based on various flawed assumptions about the overlap between human rights and protocol principles. The human rights advocates in my case study assume there is a 'natural overlap' between the IETF's engineering values and the legal principles contained within the international human rights framework. For example, they conclude that IETF's design principles, like empowering the edges of the network (rather than its core), is similar to the human rights framework's goal of empowering those at the margins of society.

This presumed philosophical overlap between the legal and technical fundamentals of the Internet and the human rights framework leads the advocates to specifically focus on bringing international human rights values to the IETF. Their work is not rooted in the potential of the Ruggie Principles to hold companies to account, rather the inspiration for their approach comes from a 2012 discussion paper published by the Association for Progressive Communications (APC).⁴⁹ This paper outlines the connection between the processes and principles driving human rights and Internet protocols.⁵⁰ In it, the authors—a human rights lawyer and an Internet engineer—argue that there are overlaps between the principles of human rights and Internet protocols. Highlighting these overlaps, they write, could help develop new approaches for advocates seeking to defend human rights in a digital age.

⁴⁹ APC is an international network of civil society organisations founded in 1990 dedicated to empowering and supporting people working for peace, human rights, development and protection of the environment, through the strategic use of Information and Communication Technologies (ICTs). See: <https://web.archive.org/web/20210213114230/https://www.apc.org/en/about>

⁵⁰ This paper was authored by Joy Liddicoat and Avri Doria and entitled 'Human Rights and Internet Protocols: Comparing Processes and Principles'. It can be found: <https://web.archive.org/web/20190902073112/https://www.apc.org/en/news/exploring-impact-internet-protocols-and-architectures-human-rights>

During the 2014 Internet Governance Forum (IGF) in Istanbul—a UN forum convened to discuss pressing Internet governance questions—this paper was presented. The Head of Digital at a European human rights organisation sought out the authors of the paper. At a party hosted by APC, the advocates considered what it would look like to implement the paper’s vision at the IETF. One year later this conversation had its desired effect. In 2015, the partygoers founded the Human Rights Protocol Considerations Research Group (HRPC) in the Internet Research Task Force (IRTF). The charter and approach of this research group closely follow the blueprint of the original discussion paper, which maps protocol principles onto human rights values to see how the latter could be upheld by the former.

In many ways, the approach of the advocates side-steps the legal tools contained within the Ruggie Principles. Rather than building on these Principles for their human rights advocacy work in the IETF, the advocates follow the central claims made in the APC research paper about the compatibility of human rights and engineering values. The advocates assume that the absence of engineering engagement with human rights questions is driven by a lack of awareness on the part of the engineers regarding the role of their protocols in upholding rights. There are multiple flaws in this approach, namely the advocates’ central assumptions fail to consider that non-adoption of human rights values in the IETF is driven by a lack of historic, economic, or cultural incentives rather than a lack of institutional awareness about human rights.

Importantly, the 2011 UN resolution accompanying the Guiding Principles for Business and Human Rights states, ‘The same rights that people have offline must also be protected online’.⁵¹ This resolution provides advocates with leverage to engage Internet companies and governance organisations, in the absence of a binding treaty for business and human rights. This resolution suggests the Internet—and the opaque infrastructure companies and governance organisations developing it—must adhere to existing human rights laws. Likewise, my overview of international human rights suggests that the human rights framework is increasingly tailored to concerns arising from the privately owned and run Internet. Yet, in this dissertation, I show that the human rights-based approach pursued by the advocates in the IETF does not draw from these legal developments and falls short of its aims. I also illustrate that the everyday practice of Internet governance and the imaginaries of the Internet that drive it, mean that technologists remain far

⁵¹ See U.N. Human Rights Council: First Resolution on Internet Free Speech, July 2012: <https://web.archive.org/web/20200309002907/https://www.loc.gov/law/foreign-news/article/u-n-human-rights-council-first-resolution-on-internet-free-speech/>

removed from, and sometimes actively hostile to, human rights advocacy efforts. To do so, in the next section I introduce my analytical framework of critical Internet governance.

3.3 Critical Internet Governance: A framework

Traditionally, research on Internet governance can be categorised in phases. I will introduce a set of the critical questions missing from the first three phases of Internet governance research including an original survey of the fourth phase, where my dissertation makes its main contribution to existing scholarship. My concept of phase four—a reflexive phase concerned with how culture replicates power dynamics—is intended to spark a much-needed debate about how knowledge claims are made about what constitutes Internet governance, and who can make those claims.

Jeanette Hofmann (2007) highlights three phases of Internet governance practice and theorising between 1986 and 2007. Following Hofmann's phases, I will present a brief overview of the most salient academic literature and central questions posed in each phase. Hofmann (2007) describes three phases of Internet governance that document its practical governance and efforts to theorise it. An initial technical phase, during which the IETF was the main Internet governance forum, was followed by a second self-regulatory phase led by industry. The Internet Corporation for Assigned Names and Numbers (ICANN) served as the forum for the second phase of Internet governance discussions. Finally, a third formative phase saw the reassertion of governments and forum diversification. In all three phases, a limited set of actors and governance questions were researched. Research questions were often anchored in the fields of economics, law, and international relations (Drake 2004; Dutton 2007; Hofmann 2007; Kahin and Keller 1997; Mathiason 2008; Mueller 2002, 2010).

The field's dominant disciplinary focus has meant that questions about culture and insights into day-to-day practices of Internet governance, from the ground up, were largely absent. Throughout the first three phases, academics argue that the Internet's topology resists centralisation and government control (Dutton and Peltu 2007; Kahin and Keller 1997; Mueller 2002) and that the governance of the Internet should reflect its networked nature (Kleinwachter 2000; Mueller 2002). This research angle suggests that, in early theorising, Internet governance academics—like many of the Internet's architects (see previous chapter)—equate technical design

principles (like modularity) with virtuous social values. This reasoning grafts design principles, and their underlying liberatory Internet imaginaries, onto the social norms guiding the practice of governance and its ‘reflexive coordination’.

I argue that doing so fashions Internet governance to the worldviews of its technocratic and elite practitioners. Often, this view involves the rejection of including progressive values and questions of rights and justice in Internet standardisation (Nelson 2002; Paris 2020). The exclusion of such critical questions in research efforts is visible throughout the early third phase of Internet governance research. Toward the end of phase three, a strong sense of collective disillusionment in the effectiveness of the private-led, self-regulatory Internet governance structures emerged (Hofmann 2007). The third phase also saw the creation of new Internet governance forums and initial steps towards the diversification of the research agenda beyond a limited number of large Internet governance organisations. A definition of governance as coordination between different actors developed, as well as how these informal arrangements can encourage novel global governance approaches (Hofmann 2007; Mueller 2010).

The second half of the third phase ushered in a more diverse set of academics, which in turn has broadened the Internet governance research agenda to include questions of equity and human rights, as well as encouraging broader reflection on civil society involvement (Drake and Wilson 2004; Jørgensen 2006). The first three phases of research on Internet governance, however, by-and-large lack a critical perspective on culture and power. That is, academics have not deeply engaged with questions of ‘how embedded power hierarchies (e.g. of culture, gender and geopolitics) could skew global multi-stakeholderism in favour of already privileged circles in world politics’ (Scholte 2020, 18–19). We are currently heading into a fourth phase of Internet governance research when such a critical approach will take on further importance.

Phase Four of Internet Governance Research

As more Internet governance academics adopt Science and Technology Studies (STS) approaches, the field is deepening its understanding of cultural forces like the role of trust, norms, and human connection (Epstein, Katzenbach, and Musiani 2016; Mathew 2016, 2014; Meier-Hahn 2015; Sowell 2012; Ten Oever 2020a). Various ethnographic case studies have been conducted on Internet governance organisations that provide important insights into governance cultures (Cath 2021; Cath and Floridi 2017; Mathew 2014, 2016; Myers-West 2017; Milan and

Ten Oever 2016; Sowell 2012; Ten Oever 2020a). Likewise, academics are considering the impact of Internet control points and telecom policies on underrepresented groups such as marginalised communities of colour (Moran and Bui 2019) and queer communities (DeNardis and Hackl 2016).

This emerging work at the intersection of critical social sciences and Internet governance is encouraging for its ability to theorise Internet governance power hierarchies. Within the field, academics are increasingly engaging with the cultural dynamics of Internet governance. Rather than making *a priori* claims, scholarship in the fourth phase is characterised by critical reflexivity on questions and practices previously overlooked. Bent Flyverbom (2016), for example, argues that the field should consider how ordering and mundane practices shape knowledge production and determine which issues are prioritised as deserving academic attention. Hofmann, Christian Katzenbach, and Kirsten Gollatz (2017) reach similar conclusions. Recent Internet governance research has done much to make some of these practices more visible (Bradshaw and DeNardis 2019; Bygrave and Bing 2009; DeNardis 2014; DeNardis and Hackl 2016; Epstein, Katzenbach, and Musiani 2016; Flyverbom 2016; Hintz and Milan 2009; Mathew 2016; Moran and Bui 2019; Musiani 2013; Myers-West 2017).

Yet, the lack of disciplinary diversity and critique of the structural power dynamics shaping Internet governance continue to curtail the field's ability to engage with crucial questions of power, culture, and equity. Research is hampered by the field's disciplinary borders with dominant disciplines of international relations, computer science, sociology, law, and economics not well-positioned to answer questions of power at the level of daily Internet governance practices. This skewed disciplinary representation has been noticed amongst Internet governance academics. In recent years, Abbate has called on academics to reconsider how their work 'shape[s] the geographic and temporal scope of our narratives, the activities we include or ignore, the dominance of certain countries and social groups and the marginality of others' (2017a, 9). Likewise, Malte Ziewitz and Christian Pentzold use the notion of 'performativity' to argue that the boundaries of Internet governance are maintained through 'our [academic] readings of discussions, seminar presentations, articles or policy briefs' (2014, 317).

To truly answer these calls for reflexivity the field needs to bring in a broader set of disciplines including cultural anthropology, cultural studies, critical race studies, and code studies. Expanding Internet governance with insights and methodologies from these disciplines can bring

new insights into how social relations and power amongst academics define Internet governance research agendas, which are still largely missing in phase four. Anthropology is particularly suited for this purpose. The discipline went through a ‘reflexive turn’ in the 1960s and 1970s, during which it developed an elaborate theoretical approach for understanding the influence of researchers in shaping their objects of study (Behar and Gordon 1996; Clifford and Marcus 2010) that can be brought to bear on Internet governance questions.

These critical social science disciplines also bring missing perspectives, on how culture, race, and gender structure individuals’ lives including their use of and access to technology, and participation in its governance. Expertise on how to examine society and technology as it relates to culture, power, and identity would provide important insights into what Jan Aart Scholte (2020, 18) calls the performance of Internet governance through ‘bureaucratic rituals, dress codes, office layouts, patterns of friendship, [and] deployments of language’. Such insights are important to understand how cultural dynamics tilt Internet governance processes in favour of its most powerful participants.

Critical race scholars have long made this point. Alondra Nelson (2002), for example, argues that the liberatory ideologies underpinning the early Internet enforced a colour-blind racism amongst its architects. She demonstrates these architects were insensitive to the fact that ‘bodies carry different social weights that unevenly mediate access to the freely constructed identity [advocated for by these architects]’ (2002, 3). More recently, Charlton McIlwain (2016, 2019) shows that the architects of Internet applications, like the World Wide Web, replicate structural inequality along racial lines. Likewise, Anna Everett (2002, 125) illustrates that the normalisation of the use of ‘master/slave’ terminology to execute commands in computer operating systems re-inscribes race and racism online. Such terminology is commonplace at the IETF and at the centre of controversy during my fieldwork, but it has not received attention from Internet governance scholars.

Recent work in anthropology can further add to these critical takes on Internet governance by theorising how discriminatory outcomes of its governance processes and practices often have cultural roots. In her ethnography of open technology communities, Dunbar-Hester (2019) argues that the importance of the norm of autonomy makes open-source organisations resistant to rules that improve diversity. Likewise, Kate Miltner (2020) looks at how the UNICODE standards body for emojis—miniature digital communication pictographs—suffers from structural

racism, leading to a lack of racial representation in early emoji sets. Joseph Reagle argues that the argumentative working style of the Free and Open-Source Software (FOSS) movement, which has many cultural similarities with the IETF, creates ‘informal but significant barriers to women’s participation’ (2013, 1) through unaddressed misogyny and aggression. Sarah Myers-West (2018, 2021) explains how technological determinism, the idea that technology autonomously structures society, is framed within the cryptographic community as rooted in civil libertarian thought, which inhibits the development of encryption tools that foreground social justice concerns.

There is limited understanding of how such cultural dynamics play out in Internet governance organisations, including the IETF. Given the ideological and professional overlap between FOSS, computing, and Internet governance communities, these cultural and discriminatory dynamics have unexplored parallels. However, to reveal them requires theoretical and methodological grounding currently underrepresented in Internet governance research. My analytical framework of critical Internet governance provides an example of how such research might be undertaken. To further explore what a future program of critical Internet governance research might look like, I reframe existing literature on the IETF’s organisational culture through an anthropological lens demonstrating that the current literature is overly positive and inconsistent with the organisation’s daily functioning.

3.4 IETF Culture: Rough conduct or golden standard

My ethnographic forays into the IETF suggest that academic assessments by Internet governance academics have been too optimistic. Their work often paints an idealised picture of the IETF that overlooks its rough edges including the exclusionary effects of its culture for minority participants, such as women, individuals from the Global South, and human rights advocates. Critical takes on IETF culture are largely missing from the literature, indicating the contribution of this dissertation, which highlights how institutional arrangements influence power and access on the ground within Internet governance. This lack of knowledge is unsurprising, given the limited ethnographic engagement with the IETF. This open standard-setting organisation, as I will show throughout this dissertation, is far less inclusive and fair than one would gather from Internet governance literature and the IETF’s self-narration.

Internet scholarship on the IETF follows a familiar pattern. Generally, it presents IETF standards and procedures—as well as its *esprit de corps* of ‘rough consensus and running code’—as representative of a fair and inclusive governance culture (Abbate 2000, 208; Bygrave and Michaelsen 2009, 98). This academic work guides ongoing research agendas, as well as policy debates about Internet governance. Some academics have even argued that the IETF is an exemplar of open Internet governance (Abbate 2000; DeNardis 2011; Lessig 2006; Mathiason 2008; Mueller 2002). In contrast, I show that these idealised descriptions of the IETF are not synchronised with reality. For this reason, I argue that academics should reconsider its suitability as a ‘golden standard’ for Internet governance.

The positive academic assessment is especially clear in discussions about the IETF’s ‘bottom-up’ governance mechanisms, in particular its openness through standards, meetings, and mailing lists. For example, Barbara van Schewick (2011, 202) writes that ‘The IETF’s standard-setting process is open to all participants, and the standards documents are available at no costs.’ She equates the IETF’s procedural openness with a cultural attitude that welcomes different types of participants. Laura DeNardis similarly argues that the IETF runs on a ‘governance philosophy of co-producing and sharing the rules of the road for Internet interoperability. (...) This philosophy translates to institutional norms about open participation, transparency of processes, open publication of standards, and a preference for royalty-free standards’ (2014, 75–76). In this dissertation, I argue that these formal procedures do not bear out when considering the politics and practices of actors in their organisational settings.

Likewise, Internet governance academics stress the IETF’s various design principles and informal practices as reflecting a progressive organisational culture (Abbate 2000; Bygrave and Michaelsen 2009; Rachovitsa 2016a, van Schewick 2011). This conflation of principles with culture overlooks the less positive aspects of IETF, which I document in Chapter Five as alienating and exclusionary, in particular to women and individuals from the Global South. The masculinity of the IETF’s culture is a particular problem in this regard and can be seen in its confrontational working practices and gendered language. The organisation describes the Internet’s original architects as ‘the Internet’s grandfathers’ and its participant base as ‘Internet greybeards’.

These practices presume that its participant either are male or comfortable with masculine work approaches rooted in ‘rugged individualism’ (Ensmenger 2015). This distinctly American

approach to computing—captured in a preference for ‘beards, sandals, and other symptoms of rugged individualism or nonconformity’ (Ensmenger 2015, 50) including the detached, technical, playful and individualistic approach to engineering I identify in my research—is key to the IETF. It is also unattainable or unappealing to many women and Global South participants.

The effects of such exclusionary cultural practices are reflected in statistics about IETF participation, as well as in my fieldwork data, with women largely missing from participants in the IETF. Yet, these structural barriers to participation in the IETF are often insufficiently understood as structural to its organisational culture. While there certainly are women to be found in the organisation’s ranks,⁵² in an average IETF in-person meeting, they often comprise only ten per cent of the total participants.⁵³ Many at the IETF ascribe this surprising gender breakdown due to ‘pipeline problems’. By this logic, the problem is simply that fewer women enter engineering fields. My research participants also dismiss women using more explicitly sexist logic; they are simply ‘insufficiently technical to make it here’.

Many of the women that I spoke to offered more systematic explanations that implicate the IETF’s hostile working culture to explain their sparse numbers. Some academics mention institutional limits to participation, such as technical expertise and resources (DeNardis 2009) and others highlight that the organisation is ‘weighted towards the West in general and the United States in particular’ (Mueller 2010, 217). These social dynamics warrant further research especially against a policy background that upholds the IETF as a standard for privatised Internet governance. It can hardly be the case that academics and policymakers would want an organisation where racist and sexist dynamics are so endemic to become a global blueprint for governing new technologies. Such research requires further ethnographic enquiry to inform those looking towards the IETF as a governance example with material information about its social functioning. Such ethnographic work is especially needed as the IETF keeps limited data on participation or incidents of discrimination.

Through my fieldwork, I found the organisation to be prejudiced against the participation of women and its participants homogenous along other axes. The limited information it collects

⁵² For example, for the duration of my fieldwork, the IETF was chaired by Dr. Alissa Cooper.

⁵³ The IETF collects information on the gender breakdown of participation at each meeting. This data, however, is not published in the aggregate as other participation statistics related to corporate affiliation or country residence are. My estimate comes from the average gender breakdown presented in the IETF plenary reports of IETF meetings included in my fieldwork period as well as from the data I collected over my fieldwork.

shows that the IETF has largely been dominated by participants from the United States and Europe, followed by China.⁵⁴ This breakdown is similar when comparing what countries IETF document authors reside in⁵⁵ and it only becomes more diverse when considering document authors' corporate affiliations, which show the growing role of the Chinese company Huawei.⁵⁶ This company—at least within the context of the IETF—regularly hires American and European engineers to represent them because Huawei struggles to get its Chinese engineers in IETF leadership positions. One of my American research participants described this dynamic in terms of the IETF's rugged culture:

A number of Chinese companies have been really pushing to get people into leadership positions. And [redacted name] had a pretty good shot for Internet Architecture Board (IAB). And then his employer [redacted name] sent an email, I also got one too: "Our company is a big customer of your company, so we want your vote for [redacted name]". And I was like, you clearly don't understand how this works and [redacted name] didn't get the position. And frankly, rightfully so. These Chinese companies don't seem to get this is not how it works, and they are much more comfortable in the traditional standards bodies where you wear a suit and either you vote as a country or at least you are sort of formally representing your company, and you speak for the company and that sort of stuff.

The engineer explained the unsuccessful leadership bid of the Chinese engineer as a function of the engineer's company's inability to adapt to IETF culture. He emphasised his point by making a stereotyping assumption about "the Chinese preference" for hierarchical, state-run, standards bodies. This reductive view of non-Western engineers, and the IETF's unwillingness to accommodate for different national working styles contained within it, suggests that the IETF's homogeneity is a function of its organisational culture. This dynamic emphasises my earlier point about the exclusionary effects of the IETF's culture. Conversely, in this dissertation, I will demonstrate that participation in the IETF's processes is more difficult for individuals with values and norms that diverge from the standard: non-Americans, non-Europeans, women and—as I argue—human rights advocates.

⁵⁴ For detailed information on IETF participation statistics see:
<https://web.archive.org/web/20210117135227/https://datatracker.ietf.org/stats/meeting/country/>

⁵⁵ For detailed information on IETF document publication statistics see:
<https://web.archive.org/web/20200914091855/https://datatracker.ietf.org/stats/document/author/country/>

⁵⁶ For detailed information on IETF author affiliation see:
<https://web.archive.org/web/20210117124721/https://datatracker.ietf.org/stats/document/author/affiliation/>

3.5 Human Rights Advocacy in Internet Governance: Futile or tour-de-force

My research responds to the contentious debate about the role and efficacy of human rights advocates in the IETF. Over the last seven years, a growing group of researchers has debated the role of human rights advocates and public interest technologists in Internet governance organisations. This work, however, is largely devoid of studies that consider how culture affects the application of human rights norms to technology development, which is necessary to further the research agenda of Internet governance's fourth phase. I add to this new phase, by applying my analytical framework to map the practical challenges posed by the cultural domain of standard-setting in which human rights advocates intervene.

In the next paragraphs, I survey the ongoing academic discussion about human rights advocacy in Internet governance. I start by placing civil society efforts in Internet governance writ large before moving to human rights advocacy in the IETF. In the latter debate, there is a clear split with some academics arguing that current IETF human rights efforts are misdirected (Mueller and Badiei 2019), while others hold that their work is crucial (Morris 2011; Ten Oever 2020a). I argue both sides could benefit from further empirical substantiation of their positions, which my dissertation provides through on the ground anthropological scholarship. Through my analytical framework of critical Internet governance, I open a new area of research that focuses on how recent human rights efforts are imbricated with IETF culture. I move beyond the 'optimistic/pessimistic' dichotomy that characterises current debates to argue that the eventual rejection of the human rights efforts speaks more to the normative force of the IETF's conservative culture than it does to the flaws in the human rights efforts.

The role of civil society, including human rights advocates, in Internet governance is a growing research topic (Cath and Floridi 2017; Harcourt, Christou and Simpson 2020; Milan 2013, 2014; Milan and Ten Oever 2016; Mueller and Badiei 2019; Myers-West 2017; Orwat and Bless 2016; Rachovitsa 2016a, 2016b; Ten Oever 2020a; Zalnieriute and Milan 2019). Some accounts suggest that civil society actors play a positive role in governance. Mark Raymond and DeNardis argue that the multi-stakeholder nature of Internet governance affords civil society a unique ability to influence technology and policy (2015, 578). Stefania Milan (2014) indicates that recent Internet governance meetings ushered in a new generation of civil society activists, their agendas

and values are more broadly rooted in social activism. As such, she describes them as diversifying the conversation about Internet governance. Milan and Niels Ten Oever (2016) similarly chronicle civil society struggles to ‘inscribe human rights’ in ICANN. Even though they conclude that the permanency of human rights struggle remains to be seen, their overall appraisal is positive.

Not all academics are optimistic about the ability of civil society to bring about lasting change. Myers-West (2017) argues that civil society’s presence in Internet governance does not always mean their concerns are included. Rather, she echoes the concerns of Madeline Carr (2015) that civil society can be easily co-opted for corporate, or State, purposes given their lack of resources. Carr demonstrates that within Internet governance procedures, ‘civil society remains relatively disempowered although it plays an important legitimising role for the other stakeholders’ (2015, 642). Milton Mueller highlights how civil society actors advocated for progressive information communication policy issues during the third phase of Internet governance (2010, 90). Yet, recently he sounded more morose and argued that human rights advocacy efforts have ‘missed the mark’ (2016). Accounts of the role of civil society also conflict when the level of analysis moved from Internet governance at large to specific organisations, like the IETF.

There are clear tensions in the emerging work on the IETF. Recent studies suggest a wide variance in how the role and capacity of human rights advocates in the IETF is understood. Internet governance academics researching the IETF largely fall into two categories: those arguing that human rights efforts provide meaningful guidance to standardisation (Bortzmeyer 2018; Cath and Floridi 2017; Rachovitsa 2016b; Rogers and Eden 2017; Ten Oever 2020a, 2020c; Zalnieriute and Milan 2019) and those who argue it does not (Mueller and Badiei 2019). To locate my theoretical contributions, I will provide further detail on these tensions. Some academics dismiss the human rights work in the IETF as a ‘requiem for a dream’ (Mueller and Badiei 2019, 1), while others insist that the advocates represent important, otherwise overlooked values (Bortzmeyer 2018; Cath and Floridi 2017; Morris 2011; Rachovitsa 2016b; Rogers and Eden 2017; Ten Oever 2020a).

Several authors argue that human rights interventions in the IETF provide meaningful and necessary contributions to the process of standards-setting. John Morris (2011), for example, stipulates that civil society contributions are important because they represent interests, users, and concerns not naturally considered by the IETF’s corporate participants. More recently,

Michael Roger and Grace Eden (2017, 802–3) argue that ‘connecting human rights activists and standards developers holds great promise in beginning to frame technical standards in terms of their social impacts and consequences. In future, the IETF may even embed this work directly into standards development’. Adamantia Rachovitsa, in a similar vein, argues that Internet standard-setting organisations operationalise human rights protection—whether they explicitly acknowledged it or not—through standards. She builds on this idea of protection to argue that lawyers, regulators, and civil society should reconsider how they can leverage existing technical work to safeguard human rights.

Some academics have become wary of such human rights efforts. DeNardis researched ‘public interest’ representatives in the IETF, predating human rights advocates. She argues that while civil society is important, its impact is limited because civil society participation does not create additional legitimacy for these bodies, does not scale, and is corporate-funded (DeNardis 2014, 91). Mueller and Farzaneh Badii (2019) argue that human rights advocacy in the IETF—the same ones at the centre of this dissertation—is futile because the advocates adopted a technologically-deterministic stance. That is, human rights efforts fail to influence the development of standards because the advocates’ approach oversimplifies the relationship between technology and society. These critics locate this failure with the human rights advocates’ framing of the problem. Mueller and Badii briefly mention that ‘the IETF is an environment where certain values favouring Internet freedom, and a culture rooted in high-tech industries and universities, prevail’ (2019, 9)—but do not go into depth on how this culture shapes IETF politics or human rights advocacy within standard setting.

These academic discussions have only hinted at the imbrication of civil society efforts with IETF culture but do not describe the normative barriers to advocacy efforts succeeding. Academics researching human rights efforts touched on, but do not theorise their findings in terms of, IETF culture. I want to move beyond the apparent dichotomy of ‘negative/positive’ appraisals by focusing on how the IETF’s human rights efforts are tied up in its conservative culture. Rather than determining that the human rights advocates wholesale succeed or fail, I analyse the cultural assumptions and views that drive their work. In doing so, I contextualise and reframe the dismissal of public interest values as an active political choice by IETF technologists. Towards that end, in the next section, I introduce the theoretical implications of my intervention in the literature about IETF culture and human rights advocacy for the recent ‘infrastructural turn’ in Internet governance.

3.6 Turning to the Infrastructure: Co-optation or core objective

Throughout this dissertation, I theorise Internet governance in terms of the dynamic relationship between technology and society in which I highlight the cultural aspects of Internet infrastructure design that make its governance such a political process. I build on the fourth phase of Internet governance research by considering engineering and advocacy practices and drawing those out to demonstrate the close cultural connection between protocols, people, and their politics. In doing so, I unsettle the core premises of the theory postulating a ‘turn to the infrastructure’ (DeNardis 2012; DeNardis and Musiani 2015; Musiani et al. 2015) in Internet governance. I argue that this theory’s key assumption, that the Internet’s infrastructure is used or co-opted as its authors argue for purposes ‘beyond their original constructed technical and policy functions’ (DeNardis and Musiani 2015, 3), is too rigid in its definition of these functions.

Critically analysing the theoretical limitations of the infrastructural turn, by building on anthropological research, also echoes my earlier call to apply critical social science approaches to the study of Internet governance. It puts my analytical framework to practice and enables me to demonstrate that what architects consider the Internet’s ‘original functions’ have always been guided by their culturally contingent imaginaries (see Chapter Two). Ultimately, I argue that the current turn to the infrastructure for the adjudication of political issues, like content moderation (see Chapter One), reflects a ‘rearrangement of the hierarchy of functions’ (Larkin 2013, 335) contained in Internet infrastructure rather than their political co-optation.

To do so, I will first introduce the ‘infrastructural turn’ in Internet governance focusing on its grounding premises. Subsequently, I outline the theoretical limitations of the turn as I see them. I explain how an anthropological framework applied to infrastructure attends to these limits by providing novel sources of knowledge for what can be known about Internet governance as rooted in the lived reality of its practice. I conclude by putting this argument about the human coding of infrastructure in the context of my case study and discuss the policy implications of my critique.

Over the past decade or so, Internet governance as an academic field has taken a ‘turn to the infrastructure’ (DeNardis 2012; DeNardis and Musiani 2015; Musiani et al. 2015). The central

premises of this turn are twofold. First, the infrastructure of the Internet, and the organisations responsible for its governance, are sites of economic and political power because governments, industry, and civil society use them for their political agendas. Secondly, these sites are ‘co-opted’ for purposes ‘beyond their original constructed technical and policy functions’ (DeNardis and Musiani 2015, 3). DeNardis and Francesca Musiani define co-optation as ‘the use of Internet infrastructures and systems of governance—such as the Domain Name Service (DNS)—for purposes other than those for which they were initially designed’ (2015, 5). Crucially, this theory rests on the existence of a set of stable and predetermined technical and policy functions of the Internet’s infrastructure.

I question the viability of this second grounding assumption, given the earlier introduced inherent cultural inflexion of protocol development and the political nature of its governance (see Chapter Two). In what follows, I critically reflect on what my dissertation adds to the first and second premises of this turn. Some Internet governance academics question the first premise. They argue that infrastructure has always played a prominent role in political discussions (Mueller and Badiei 2019). This is true; as DeNardis and Musiani (2015) acknowledge, infrastructure has permanency as a site of political contention. They do not argue that there is anything completely new about Internet infrastructures being proxies for politics.

Rather, the authors of the turn argue that the current use of infrastructure is more blatantly political than before. In their words, the infrastructure is used to ‘carry out functions completely extraneous to the core technological objective of the system’ (2015, 19). DeNardis and Musiani argue that using infrastructure for such external functions raises questions about the ‘unintentional consequences of these developments for the stability and security of the Internet as well as human rights online’ (2015, 19). The crux of their argument, thus, relies on the second premise of the infrastructural turn—how the ‘original policy and technical functions’ are co-opted for novel political purposes.

A different way to build on this turn would be to problematise how it can be known whether something constitutes an ‘original technical or policy function’ and ‘co-optation’ of Internet infrastructure. This question raised by the infrastructural turn’s second premise concerns epistemology. The main proponents of the infrastructural turn have not clearly delineated the ‘original technical and policy functions’, or what sources of knowledge can be brought in as

evidence to define them.⁵⁷ Considering the multiple histories of the Internet’s development (Abbate 2000, 2012, 2017; Clark 2018; Turner 2010, 2017)—and the technical, commercial, socio-political, cultural functions it serves (Braman 2011a; Deibert et al. 2008; Carr 2015; DeNardis 2009, 2011, 2014; Musiani et al. 2015; Wright 2012)—it is evident why defining such sources of knowledge is difficult.⁵⁸ Throughout this dissertation, I will argue that the functions of the Internet have evolved with its role in society, which makes it difficult to develop static indicators for its original functions.

This limitation of the ‘turn to the infrastructure’ is important given the relationship between the Internet’s technical and social functions. Rather than understanding the Internet’s infrastructure as having a limited number of functions that can be co-opted for political purposes, I argue infrastructure should be viewed through the prism of anthropological studies of infrastructure. Principally, my work is informed by Larkin’s ‘politics and poetics of infrastructure’ (2013). He argues that infrastructures reflect a ‘hierarchy of functions’ (Larkin 2013, 336), in which the technological functions are not automatically dominant given the underlying social relations required to make them perform. Rather than seeing particular uses of infrastructure as co-optation, this focus allows developments in infrastructure to be seen as a social change in the ranking of functions. This prism, in turn unlike the co-optation framing, clears a pathway for understanding the constant rearrangement of the political priorities driving Internet governance, because it accommodates for the direct connection between its social and technical functions.

Bringing this anthropological prism to Internet infrastructure also reconfigures the role of human rights advocates in the IETF. One of the questions left unanswered by the turn is where such evidently political use of the infrastructure figures in its theory: should human rights advocacy be seen as co-optation or as a core objective of Internet infrastructure? Following the turns’ logic, it can be argued that using protocol development in the IETF for human rights advocacy is a political use of infrastructure beyond its intended purposes. This is important as the turn considers most examples of co-optation as inherently bad for the Internet’s stability and security.

⁵⁷ For example, Musiani in Musiani et al. (2015, 73-74) argues that the development of decentralised alternatives to the DNS showed ‘how Internet governance infrastructures are increasingly being co-opted for political purposes irrelevant to their primary Internet governance function (...)’. Later in that same piece, she cited these functions to be ‘name registration (...), name resolution (...) and trust’. She does, however, not provide an in-depth explanation for why these functions were central, nor does this example elaborate on the fundamental social (as opposed to technical) nature of trust (Mathew 2014; Meier-Hahn 2015).

⁵⁸ These difficulties go back to the Internet’s initial development as illustrated by Janet Abbate (2000, 1) who detailed that ‘for many years there was no consensus on what its [packet switching] defining characteristics were (...) in part because computer scientists evaluated it in ideological as well as technical terms’.

I do not see human rights advocacy in the IETF as improper use of the infrastructure with negative consequences. Rather, I call on researchers to approach human rights advocacy in the IETF as a rearrangement in the infrastructure's hierarchy of functions that reflects civil society's growing concerns about the unaccountable nature of Internet (infrastructure) governance.

Viewing these infrastructural developments as political rearrangements also matters for policy discussions. How governance academics define Internet governance and ascribe primacy to specific policy and technical functions impacts how they are acted upon by practitioners. In policy circles, there is a trend to bracket the 'public core' (Broeders 2016) of the Internet from its consumer-facing uses to protect the Internet's infrastructure from 'unwarranted political interventions' through the development of state-based international norms guiding its use.⁵⁹ This policy approach falls into the same epistemic trap as the infrastructural turn and hinders important discussions about the inherent politics of infrastructural (or public core) governance, as earlier examples of Cloudflare and Parler imply (see Chapter One). Instead of entrenching policy in such deterministic approaches, my work calls for the repoliticisation of Internet infrastructure, which is necessary to develop novel accountability measures for distributed digital systems.

3.7 Conclusion

In this chapter, I offered a novel analytical framework for answering my main research question of *What role IETF culture plays in its infrastructural politics?* This framework draws together theories from anthropology with ongoing Internet governance research to enable critical research into the affective and cultural aspects of human rights advocacy efforts in the IETF. I introduced a brief history of the legal and political limitations advocates face when using the human rights framework to hold the Internet sector to account. In the process, I offer the IETF's culture and its sociotechnical imaginaries of the Internet as inherently good as novel facets to explain the limited success of these civil society interventions.

⁵⁹ In the 2016 report by Broeders called 'The Public Core of the Internet: An International Agenda for Internet Governance', he and his co-authors argue that the core protocols and infrastructure of the Internet must be seen as a public good and a neutral zone that should be protected from unwarranted state interference. See: Broeders, Dennis. 2016. *The Public Core of the Internet: An International Agenda for Internet Governance*. WRR Rapporten. Amsterdam: Amsterdam University Press. https://doi.org/10.26530/OAPEN_610631.

This empirical analysis of the international human rights framework leads to my treatment of the four phases of Internet governance. There, I identified the lack of structural consideration of questions of power and culture in the first three phases. I explain these oversights as a function of the field's limited disciplinary remit as well as being rooted in practitioners and academics shared affinity for the liberatory imaginaries guiding Internet governance. In this part of my review, I stress why Internet governance scholarship should look towards critical disciplines, like cultural anthropology and critical race and code studies, to find new sources of knowledge for answering outstanding questions about the nature of Internet governance. These new disciplinary interventions are needed to answer some of the broader questions relevant to technology policy today, not least those related to how Internet governance processes reinscribe racial and gender inequities in Internet infrastructure.

My analytical framework weaves together three seemingly disparate Internet governance debates about IETF culture, rights advocacy, and the infrastructural turn by bringing cultural texture to the main questions and disciplinary approaches guiding these debates. Regarding IETF culture, I questioned the positive appraisals of the IETF in Internet governance literature by recoding this standards-setting organisation as conservative and exclusionary. This cultural view is crucial to my argument that the IETF should not function as a model for global governance, nor should its cultural standards be guiding in debates about responsibility in infrastructural politics. Following which, I countered ongoing academics debates about the role and efficacy of human rights advocates in the IETF. I move the discussion beyond the apparent dichotomy of positive and negative appraisals to ask how these civil society interventions are imbricated with the IETF's conservative culture.

I responded to the questions my analytical framework raises for recent work on the 'turn to the infrastructure' (DeNardis 2012; DeNardis and Musiani 2015; Musiani et al. 2015). This turn posits that the Internet's infrastructure, and the organisations that maintain it, are co-opted for political purposes that undermine the Internet's functioning (DeNardis and Musiani 2015, 3). I challenge the turn's foundational assumption that is epistemically possible to make a clear-cut distinction between original and external, or novel, use of these functions. This allows me to reposition human rights advocacy as a function in the hierarchy of purposes served by Internet infrastructure.

Finally, I applied my analytical framework to argue that further research on human rights advocacy in the IETF matters for ongoing technology policy efforts. Understanding the entanglement of the Internet's social and technical functions—of minds and machines—is important as it defines which actors and actions governing the Internet's infrastructure are seen as legitimate by policymakers and as such are, or are not, subject to enhanced scrutiny through regulation or oversight. My work demonstrates the role anthropology can play in providing new sources of knowledge about the nature of Internet governance and the functions of its infrastructure.

4. Methods: Pushing All the Wrong Buttons

4.1 Introduction

During a meeting of the Réseaux IP Européens (RIPE)⁶⁰ forum in 2016, I presented findings from my master's thesis⁶¹ to a group of network operators, many of whom participate in the Internet Engineering Task Force (IETF). In the presentation, I argued that these technologists have a responsibility to consider the impact of their technical decisions on society. This might seem obvious or even blasé, but in this technical community a pro-active approach is contentious. Jan Aart Scholte, a global governance scholar who researches Internet governance, watched my presentation. Afterwards, we met, and he asked some follow-up questions. Given our shared interests in Internet governance cultures, we discussed our findings and fieldnotes. Below is what Jan relayed about his neighbour's reaction to my presentation:

I was not sure whether to tell you this, but I sat next to this technical guy, a network operator, during your presentation. And you might want to know what he said about you. Here, look, I jotted it down: “Ah yes, young female anthropologist pushes all the wrong buttons”.

This short vignette neatly captures my main arguments in this dissertation. First, the community involved in the technical governance of the Internet has clear (if often unspoken) conservative norms about who belongs in its culture. By extension, these norms define whose politics are included in protocol design. The outward commitment to technical excellence notwithstanding, belonging to this group requires the performance of a white, male, Euro-American engineering approach. This approach is defined by committing to a narrow set of politics and practices rooted in liberal notions of freedom and autonomy.

⁶⁰ RIPE provides global Internet resources and related services to their members in Europe, Russia and the Middle East, their members include Internet Service Providers (ISPs), telecommunication providers and large corporations. As many RIPE members are network operators, they are also keenly aware of the work the IETF does as they are the communities implementing IETF standards. For more information about RIPE, see: <https://web.archive.org/web/20210110081939/https://www.ripe.net/about-us/what-we-do>

⁶¹ For my master's degree, I wrote about the Human Rights Protocol Considerations Group (HRPC). My 2015 master thesis was entitled ‘A Case Study of Coding Rights: Should Freedom of Speech Be Instantiated in the Protocols and Standards Designed by the Internet Engineering Task Force?’. In it, I make the case for the need for a more delicate consideration of human rights values by IETF engineers. Not by baking human rights values into their designs, but by understanding and identifying tensions between their design and human rights values. This dissertation builds on those early findings. Cath, Corinne. 2015. ‘A Case Study of Coding Rights: Should Freedom of Speech Be Instantiated in the Protocols and Standards Designed by the Internet Engineering Task Force?’ *Thesis for Degree in Master of Science in Social Science of the Internet, Oxford University*, August. <https://mailarchive.ietf.org/arch/attach/hrpc/pdfbyB1Dp.pdf>.

Second, Jan's neighbour's comment suggests that, by revealing the social implications of Internet protocols and their inherent politics, I was pushing 'all the wrong buttons'. This comment also emphasises that research of Internet governance cultures requires methods that interrogate existing norms and questions taken for granted knowledge. In this chapter, I outline how my anthropological research approach enables such research and provides the methodological basis of my analytical framework of critical Internet governance (see Chapter Three).

In many ways, all IETF participants—human rights advocates and engineers, and the ethnographers studying them—are peers. They are all part of what Elizabeth Traube calls 'the knowledge classes: individuals who claim status on the basis of possession of special knowledge' (1996, xv). During my research, I found that human rights advocates faced an obstacle of rigid IETF cultural practices. If a social value could not be engineered (i.e., measured, statistically tested, and directly observed in the network) it could not be known. In practice, this meant that the politics, experiences, and values of the human rights advocates at the IETF were often not included in the material design of the Internet. Likewise, my research was described as 'anecdotal' or 'not scientific enough' by IETF participants, because I did not use quantitative methods to understand IETF culture.

Yet, it is precisely these social dynamics of rendering different types of data and experiences as irrelevant that indicate how designing protocols is sociotechnical work, that requires *minds and machines*. While the role of the latter can often be measured quantitatively, the social aspects of engineering cannot be numerically accounted for. Much as some of my research participants might disagree, to account for the human factor of Internet standards-setting, qualitative research is needed. Applying anthropological tools to the study of human rights advocacy in the IETF allows me to surface how cultural forces shape the inclusion of politics in standards' design and governance. It also enables me to ask how things could be different, given that IETF practices, protocols, and values are neither natural nor inevitable.

Anthropological methodologies allow me to draw from a diverse set of methods and data sources that reveal the complexity of IETF culture. In the remainder of this chapter, I outline my research approach, including the methods I use and the methodology that informs my overall findings (see Appendix I for how my methods and data informed my research questions and empirical chapters). This chapter is structured as follows. Initially, I present an abbreviated *Overview of my Fieldwork*. Subsequently, I introduce my *Theoretical Foundations*. Then, I discuss

ethnography as my main *Methodology*, associated *Methods* and *Data Sources*, including their limitations. Finally, I present my *Ethical Considerations* and *Conclusions*. Figure 3 below provides a visual overview of my research approach and is this chapter’s roadmap.

1. Theoretical Foundation

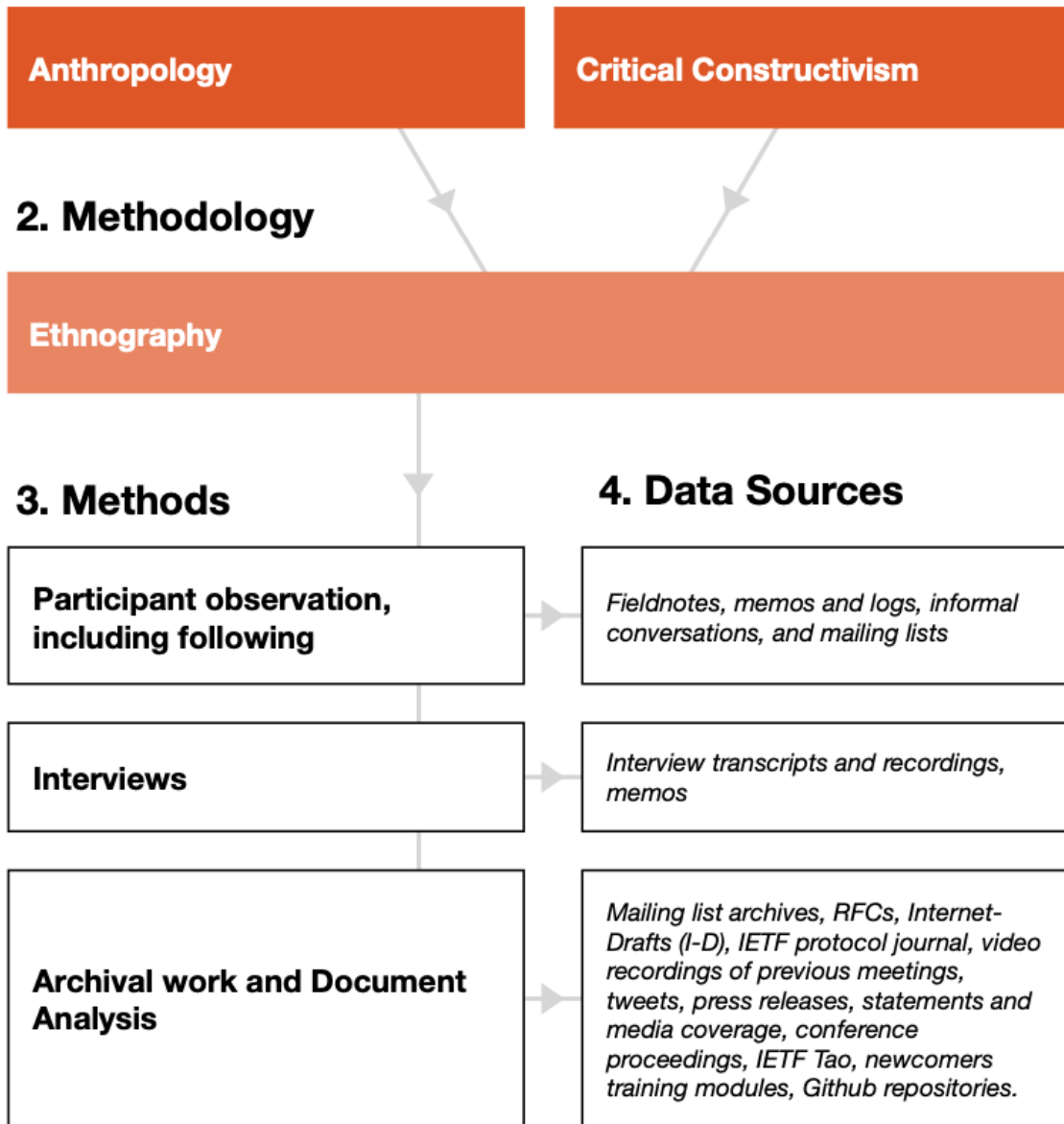


Figure 3: Overview Research Approach

4.2 Fieldwork in Brief

My fieldwork focused on the motivations and struggles of human rights advocates and engineers as they navigated the landscape of the day-to-day work of the IETF. To quickly reiterate, in 2015 three human rights advocates started a research group called the Human Rights Protocol Considerations (HRPC) group in the Internet Research Task Force (IRTF). The HRPC group consisted of about 75 individuals, with about 15 to 45 making up the core group of individuals driving the work. While the number of participants fluctuated, roughly a third worked for industry, a third for Non-Governmental Organisations (NGOs) with a human rights or civil liberties mandate, and a third in academia. A minority of individuals came from government or other Internet governance organisations.

Between 2015 and 2020, I attended all of the IETF's triannual meetings—totalling 18 meetings. Of these 18, I attended eight in person and ten remotely.⁶² This period encompassed my fieldwork time during my master's degree, employment for a human rights organisation, and DPhil dissertation fieldwork. Between late 2016 (the start of my DPhil programme) and 2020, I engaged in online and offline participation at the IETF for my dissertation research purposes. During this time, I participated in 13 IETF meetings—five in-person and eight online. As I became more involved in the IETF, I started to notice the unspoken cultural (rather than merely technical) hurdles the advocates faced in the development of their 'human rights protocol considerations' for IETF engineers and their protocols. It is this extended time in the field, that enabled me to detect these subtle distinctions, which became the leitmotif of my overall dissertation research on the role of IETF culture in its infrastructural politics.

My fieldwork included participation in two RIPE meetings, three global Internet Governance Forums (IGFs), the yearly United Nations (UN) convened forum for discussing Internet policy, and three national IGFs. I used these IETF-adjacent meetings to conduct interviews and observe human rights advocates and IETF engineers in the broader Internet governance landscape. During this same period, I took several online courses on Internet standardisation and internetworking. As David Hess argues, ethnographies of technology require 'near native technical competence' (2001, 239). I hesitate to call my skills 'near native', but my deepened

⁶² In 2020, all IETF meetings were held online due to the Covid-19 pandemic. The high costs of attending IETF meetings in person meant that I opted for a combination of online and offline participation. I made sure to attend at least one meeting on each of the locations the IETF attends frequently (Asia, Europe, and North America).

technical understanding helped me figure out ‘which buttons to push’. While I have yet to develop any running code for existing IETF standards, advancing my technical understanding helped me build rapport with my research participants. Basic technical knowledge is, as Christian Sandvig (2010, 144) explains, crucial for social scientists and this technical knowledge helped me to know what questions to ask of the protocol design process.

My dissertation research proceeded following figure 4. In the first year, I focused on upskilling my technical knowledge, analysing the IETF’s archives (my sampling strategy can be found in section 4.5) and mailing list discussions about human rights in the IETF. Year two and three were fully devoted to my ethnographic fieldwork. During this period, I did all my interviews and in-person participation in IETF meetings. In year four, I continued to follow online discussions to substantiate my findings and theory development. I also took a step back from my participant role in the IETF and the HRPC group in the IRTF. I continued to follow the human rights conversation in the IETF online, but no longer attended in person or interviewed participants. Instead, I used online participation to corroborate my findings rather than conduct additional analyses. Synthesis and triangulation (Seale 1999) of data sources in year four enabled me to provide a ‘thick description’ (Geertz 1973, 3), by which I mean description that pays attention to contextual detail when researching social meaning, of IETF culture and its implications for the politics of human rights advocacy efforts.



Figure 4: Dissertation Research Timeline

4.3 Theoretical Foundations: Critical Constructivism

In this section, I elaborate on the theoretical foundations of my research in anthropology and critical constructivism that guided my ethnographic fieldwork. Cultural anthropology has the tools to answer my central questions about Internet governance. Yet, I found little interconnection of the methods or theories from anthropology to the study of Internet governance, a gap that justifies my anthropological approach. My academic training as an anthropologist as well as anthropology's suitability 'for thinking through encounters between disparate knowledge communities' (Seaver 2017, 2) further grounding my research approach. Anthropology's focus on fieldwork, participant observation, 'deep hanging out' (Clifford 1996; Geertz 1998; Rosaldo 1993) and 'being there' (Geertz 1988)—or in other words: emerging oneself in organisations and their cultures—can yield new insights into how the Internet is governed. For example, anthropology can elaborate on how politics are translated to protocols, at the level of social behaviour because it surfaces how tacit norms and worldviews guide technical processes.

My contribution to anthropology lies in critically analysing IETF culture and repositioning the organisation's worldviews and technologies in terms that are at times uncomfortable or unfamiliar to my research participants. The narrative arc presented in my research encourages reflection and introspection among the community under study (Taylor 1998) and helps IETF participants critically question the negative effects of their cultural traditions and the impact of protocols on society. Anthropology and its methodology of ethnography can enrich ongoing Internet governance debates, as without such research the human components that drive networked technologies risk being overlooked.

My work is grounded in critical constructivism (Kincheloe and McLaren 2005; WynJones 2001), a philosophical orientation to what can be known about the world, rooted in the assumption that knowledge is socially constructed and contextual (Atkinson and Hammersley 1994; Denzin and Lincoln 2000; Guba and Lincoln 1994). My study contributes to 'the science of contextualisation... [which] always involves experience-based enquiry into the interpretive, institutional, and relational makings of the present' (Greenhouse 2010, 2). This philosophical orientation to the nature of knowledge, allows me to explore the social complexity of the IETF (Denzin and Lincoln 2000) by grasping how its participants 'make sense' of the world in which they live by altering, improving, subverting, or reinforcing it (Liamputtong 2013). However, just

contextualising engineers and human rights advocates within the IETF does not constitute a critical approach.

I add ‘critical’ to constructivism because, unlike conventional constructivism, I am not ‘agnostic about change in world politics’ (Hopf 1998, 180). I researched a group of powerful elite engineers and human rights advocates. It is not just my aim (as many of my research participants thought) to paint an ‘accurate’ picture of IETF, in the sense of affirming the assumed positive effects of its cultural practices. Rather than, or in addition to, giving ‘voice’ to social concerns—as is often done by anthropologists studying marginalised (rather than elite) communities—I problematise the worldviews of my participants as out of step with societal discourse on private sector human rights responsibilities. In doing so, I actively contribute to ongoing policy discussions about corporate accountability in the technology sector, the efficacy of human rights advocacy in Internet governance, and what change is affected to Internet standardisation when IETF engineers and human rights advocates debate infrastructural politics.

4.4 Ethnographic Methodology

Ethnography informs my research as the questions I raise require in-depth knowledge and an intimate understanding of sense-making processes in the IETF. I see ethnography as the science of storytelling. Holloway similarly suggests that ethnographers are storytellers (1997, 1); they highlight seemingly disparate events and individual narrations of situations to uncover underlying motivations. Ultimately, ethnographers triangulate these narrative fragments with other data sources to tell a story with explanatory power (Atkinson and Hammersley 1994; Davies 1998; Hess 2001).

There are many ways that ethnographers tell their stories. To answer my main research question of ‘What role does IETF culture play in its infrastructural politics?’ I must tell a compelling story about what it means to do human rights work in an idiosyncratic Internet governance organisation like the IETF. Three ethnographic approaches are particularly suited to this goal: multi-event case study, ‘studying up’, and broadening ethnography with additional methods to capture my field site.

For this project, I wielded ethnography in the following three ways. First, I decided to undertake a multi-event case study (Delgado and Cruz 2014), studying human rights advocates within the IETF across multiple events, rather than a multi-sited (Marcus 1995) ethnography of human rights advocacy across several Internet governance organisations. Second, I chose to study-up and focus on IETF participants, rather than on the communities who use or are affected by Internet standards. Third, I expanded my methodology with number of methods not always included in ethnography, including interviews, document and archival analysis.

I included these methods for various reasons. The archival work helped me enlarge the timeframe of my research, as the start of the human rights work preceded my dissertation fieldwork. I regard the online components of my fieldwork (mailing lists, virtual meetings, IETF archives) as embedded with the IETF's larger 'social space' (Miller and Slater 2001). The close connections between the online repositories of mailing list conversations, standards documentation, and the IETF's day-to-day functioning led me to, as other anthropologists of technology have done (Coleman 2015; Kely 2008), include archival work, interviews, and document analysis under the umbrella of ethnography. On the whole, this ethnographic approach allows me to provide novel insights into how the worldviews of elite IETF participants shape their rejection of human rights politics and cement their organisational culture.

Case Study

As is often happens with ethnographic case studies, my interest in human rights advocacy in Internet governance was sparked by a deep personal curiosity (Richards 1999, 425). During my bachelor and master's degree in anthropology, I researched how activists use social media to agitate against injustice. For my second master's degree, I became interested in what that agitation looks like in Internet infrastructure governance (Cath and Floridi 2017). After graduating from this second degree, I spent a year working for a human rights organisation that actively worked in the IETF. During that year, I participated in the IETF and various other Internet governance organisations, including the Internet Corporation for Assigned Names and Numbers (ICANN) and the Institute of Electrical and Electronics Engineers (IEEE). This professional experience influenced my dissertation research plan and allowed me to build a broader support network than could have been achieved solely through my DPhil fieldwork.

In my initial dissertation plan, I set out to do a comparative multi-sited case study (Marcus 1995) of human rights advocacy across three different Internet governance organisations: the IETF,

ICANN, and the International Telecommunications Union (ITU). I wanted to understand the differences and similarities between the work of human rights advocates across these different organisations. However, the resources needed for that study went beyond the personal and institutional support I had access to. In reassessing my dissertation research plan, I built on my literature review and drew from my prior personal experiences. This led me to focus on the IETF, which presented the most distinct rendering of my central object of analysis (Angrosino 2007; Burrell 2009): human rights advocates in Internet governance.

Given my financial and time constraints, I chose to do a case study of an organisation where I had existing contacts, interlocutors, and access as this made both practical and methodological sense. The IETF also had the longest-running human rights efforts, as well as a history of such public interest interventions in its design (see Chapter Two), with which I was already familiar. In her ethnography of Wall Street, Karen Ho (2009) emphasises how selecting familiar field sites leads to ethnographic depth and ‘thick’ description. Furthermore, as I mentioned in Chapter One, the IETF is an important site for understanding how human rights advocacy efforts are received by infrastructural companies because the reaction of its engineers speaks to the broader reception of progressive norms in ‘Big Tech’.

When I began my ethnographic study of the IETF, it was not a formal legal entity. Rather it was an ‘activity’ of the Internet Society (ISOC)—an organisation mandated ‘to promote the open development, evolution and use of the Internet for the benefit of all people throughout the world’. Throughout my fieldwork, the IETF became a legal entity to facilitate its fundraising efforts and gain independence from ISOC leadership and steering. The IETF’s formal status, however, did not fundamentally change its working practices or the myriad ways in which people spoke about the organisation. My research participants alternately referred to the IETF as a community, a commercial organisation, and their ‘family’ or ‘tribe’. This multiplicity makes the organisation a particularly interesting and potent field site for an ethnographic case study. As George Marcus and Michael Fisher (1999, 116) argue:

...it is here that the power of ethnography as cultural critique resides: since there are always multiple sides and *multiple expression of possibilities* active in any situation, some accommodating, others resistant to dominant cultural trends or interpretations, ethnography as cultural criticism locates alternatives by unearthing these multiple possibilities as they exist in reality.

To unearth the ‘multiple possibilities’ of human rights advocacy in the IETF, I modelled my ethnographic approach on the hallmarks of traditional ethnography (Wolcott 2008) while adapting it to the restrictions of my particular case study. Researching the IETF required frequent (and costly) travel to far-flung destinations for fieldwork for shorter periods and in more comfortable circumstances than afforded to many anthropologists. I needed to learn a new language spoken mostly by machines (see Picture 1 and 2 below) and immerse myself in its culture. The nature of the IETF’s functioning, with three in-person meetings per year and discussions on mailing lists, led me to focus my case study on multiple events, as I elaborate in the next section.



Picture 1, 2 IETF Machine and Human Languages. Author’s picture

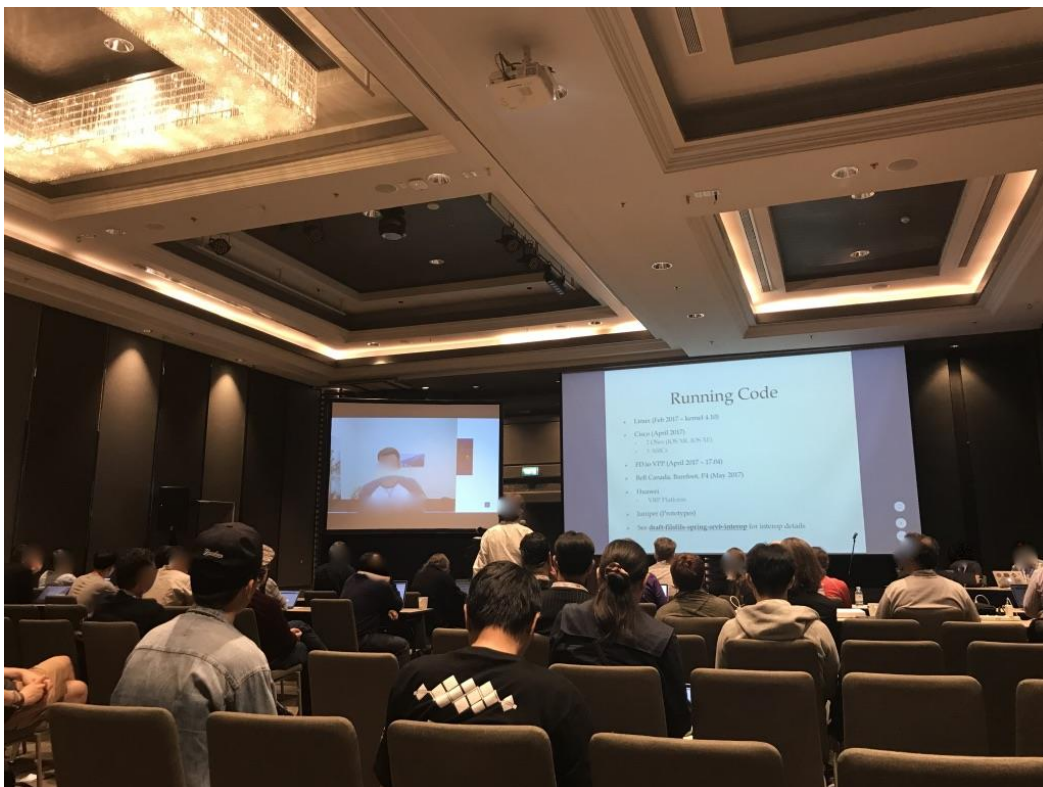
Multi-Event Ethnography

The IETF functions through three-yearly events and online email conversations. This organisational functioning makes a multi-event approach (Delgado and Cruz 2014) a logical choice. Multi-event ethnography builds on multi-sited ethnography (Marcus 1995), in which ethnographers follow their main interests, whether the organisational culture of Apple (Garsten 2011), diversity advocates in hacking spaces (Brooke 2019; Dunbar-Hester 2019), or Internet protocols (Dourish 2015; 2017) across multiple sites and events. The multi-event approach mirrors the nature of the IETF and its globally rotating meetings, (online) interim meetings and presence of its senior participants at other Internet governance events. For my research, I specifically followed the human rights advocates across multiple events.

This multi-event approach took me to multiple five-star hotels and conference venues across the world (see Picture 3 and 4 below). This approach expanded my analysis beyond the bounds of the IRTF and into the IETF, as I accompanied the advocates across multiple events. As my research progressed, it also led me beyond the IETF itself, following the advocates as they navigated various Internet governance events. This meant my field site was not strictly contained by the organisational bounds of the IETF. Such analytical developments are not uncommon, as Jenna Burrell (2009, 184) argues:

(...) field site selection must become something that is done continually throughout the process of data gathering. It cannot be decided once and for all in the early stages. In deciding what to include and what to exclude, some difficult strategic choices must be made.

Yet, given the advocates' focus on standardisation my findings primarily address the IETF. A multi-event approach aligned with my ethnographic methodology, as well as the nature of my field site. This ethnographic approach helped me capture the various strands of human rights work and networks of human relationships built between advocates and engineers—two aspects that would have been hard to capture had I narrowly defined my field site.



Picture 3: IETF Working Group. Author's picture



Picture 4: IETF Reception in Bangkok. Author's picture

Studying Up

The elite nature of the IETF's processes and participant base require a 'studying up' (Nader 1972) approach to ethnography. Decisions made by a small group of relatively unaccountable IETF engineers shape the day-to-day usage of the Internet by 3 billion users, affecting their privacy, accessibility, security, and human rights. It is important to turn our gaze on this group of people, often (self) described as having a fundamentally open and accessible culture. Studying up is a 'theoretical orientation' (Seaver 2014, 1) that guides how we can 'understand powerful elites' (Gobo 2008, 16).

Laura Nader specifically mentions the need to study politicians, scientists, lawyers, judges, police officers, and corporate executives. Given the increased importance of technology companies, recent ethnographies have included technology product managers, hackers, and start-up founders (Coleman 2017; English-Lueck 2002; Marda and Narayan 2021; Marwick 2013; Metcalf, Moss, and boyd 2019). I add network engineers and human rights advocates maintaining the Internet's infrastructure to that growing list.

Ethnographers who study up face a distinct set of challenges. Research participants read our work, and these close relationships between researcher and participant can complicate ethnographic fieldwork (Gusterson 1997; Forsythe 2002; Traweek 1992). Sometimes participants actively sabotage research efforts (Gusterson 1997; Kunda 2006). At other times, anthropologists compete with them over access to resources (Forsythe 2002; Ortner 2010). All of these dynamics put researchers in a precarious position, as the success of our research efforts are tied to the power dynamics of our field sites. Being a non-native English speaker, a young woman, and not an engineer made me a minority in the IETF (if not the almost inverse of the ‘average’ participant).

My concerns in terms of what this meant for my access and rapport were not hypothetical, as I showed in the introduction to this chapter. Yet, the growing pains of studying up showed me that the strength of my research resided in my ability to push engineers’ buttons. The agitation caused by my work indicated that I was asking the *right* questions, as anthropologist Clifford Geertz (1973, 213) explains: ‘Men do not care to have beliefs to which they attach great moral significance examined dispassionately’. In the technologists’ discontent with my findings, I confirmed that my ethnographic methodology and associated methods were able to draw out new data and grounded insights about Internet governance practice as culture.

4.5 Methods and Data

I employed a variety of methods that derive from my methodological grounding in ethnography. In this section, I will discuss the three interconnected methods I used: semi-structured elite interviews, participant observation (including ‘following’ research participants in my field site), and archival analysis. The first two methods are driven by my ethnographic methodology and critical constructivist orientation. I added analyses of IETF documents and archives, including online mailing lists, because, as mentioned earlier, these resources provide a crucial data source for understanding the IETF’s cultural and political history (Baym 1994; Braman 2011a).

Taken together, these methods provide a complementary approach to studying human rights advocacy in the pluralistic setting of Internet standardisation. Each of my methods (participant observation including following, semi-structured elite interviews, and archival analysis) and their limitations will be discussed below. Overall, I employed what David Collier (1993, 105) refers to

as an ‘eclectic approach’ in which researchers embrace creativity and draw upon diverse methods and data sources. Such an approach is common for digital anthropologists studying elites, given the difficulties of gaining access to their organisations and motivations (Gusterson 1997).

Participant Observation

Throughout my fieldwork, I made use of participant observation. Participant observation is ‘an omnibus strategy that contains a variety of information gathering techniques that involve various forms of observation, from unobtrusive ones to full-scale participation’ (Ervin 2000, 142). In my dissertation, I complimented participant observation with a ‘following’ research participants approach (Burrell 2009; Marcus 1995). Participant observation is characterised by participating in the processes and organisations studied by becoming actively involved in their culture (Atkinson and Hammersley 1994) and milieu (Taylor and Bogdan 1984). In my case study, participant observation was a necessity. The IETF is a complicated social world and given its haphazard historical formation, informal working processes, and unbounded nature, it is hard to understand its culture from the outside.

Following David Waddington (2009), I used participant observation to develop my ethnographic insights about the actions, attitudes, and motivations of the engineers and human rights advocates at the core of my research. There are three components of participant observation. First, it is always inherently dual-purpose (Ervin 2000; Spradley 1980). As a researcher, I observe and participate, which leads to a second, distinct, feature of participant observation: the tension between being a participant and being an observer (Boellstorff 2015; Forsythe 2002; Rabinow 1977), which is inherent to simultaneously being an insider and an outsider (Atkinson and Hammersley 1994). The final component is reflexivity and record-keeping of the events witnessed and personal observations (Atkinson and Hammersley 1994; Spradley 1980). I will describe how I engaged with each of these three components of participant observation below.

All ethnographers face the question of where they place themselves on the spectrum between observer and participant during their fieldwork (Behar 1966; Gold 1958; Rabinow 1977). In this study, I initially took the role of observer-as-participant, gradually moving towards the participant side of the spectrum: ‘participant-as-observer’ (Burgess 1984). Meaning that, in the first year of my fieldwork, I followed the discussions online and offline but limited my participation in those discussions. The insights I acquired during this period helped me shape the framework and

language of my research questions to meet the ‘lived reality’ (Denzin and Lincoln 2000, 3) of the interviewees.

In years two through four, I took a more active ethnographic role: I volunteered to take notes (or ‘scribe’) for IETF and IRTF working group meetings. This helped me understand the main issues of contention, understand the organisation and its culture, as well as get up to speed on technical discussions. Participating as a note-taker introduced me to the unspoken rules of the IETF and helped me become, in the words of one of my interviewees, ‘trusted, known, and part of the tribe’. Furthermore, I supported the logistics of the human rights research group, for example, by translating documents, ensuring speakers got from their hotel to the venue and making dinner reservations. I would, in this process, always focus on tasks that required execution rather than agenda-setting or decision-making. I also made myself available to all the group’s members and IETF leadership to discuss topics when they thought they ‘needed an anthropologist in the room’.

As mentioned, prior to starting my dissertation, I participated in various working groups by ‘wearing different hats’ (as the IETF expression goes). I worried my changing affiliations (from a master’s student, to human rights organisation employee, to DPhil researcher) would confuse my interlocutors. In response, I took various steps to clarify my dissertation research purpose. First, I used the IETF’s institutional processes to disclose my changing professional affiliations. Second, I checked-in with my participants about my changing roles. Because the IETF self-narrates its work as volunteer-driven, it is normal for peoples’ affiliation to change over time. It seemed that, since my work was largely research-oriented, my research was not undermined by my previous affiliations. However, to refresh my perspective and ‘make the familiar strange’ (Van Maanen 1995, 151), I spent the first year of my fieldwork on the observer side of the ethnographic spectrum. This allowed me to reposition and reintroduce myself as an academic studying IETF culture rather than an employee of an organisation working on human rights.

During my master’s degree in 2015, I became one of the two penholders of a crucial document of the Human Rights Protocol Considerations’ (HRPC) group. Early in my dissertation research, I decided to keep that position because it allowed me to closely follow the discussions about human rights and get input on the work without being expected to lead discussions.⁶³ Being

⁶³ IETF and IRTF document penholders usually act as rapporteurs rather than drivers of discussions.

involved in the process of creating a Request for Comments (RFC) from start to finish helped me, as Paul Diesing (1972, 291) states, ‘learn the concepts and distinctions [of a culture] not just by asking people or reading an article but by participating’. Due to the IRTF’s publication procedures, this means I am one of the two authors of RFC 8280, the IRTF’s human rights group’s document outlining human rights protocol considerations for Internet standardisation.

Given the offline and online components of my participant observation, my data gathering required a bespoke collection process. I could not rely solely on traditional methods, such as taking notes and daily memos after the conclusion of a day of participant observation (Rabinow 1977). For the offline component, I followed the rhythm of traditional ethnographic fieldwork; each day at an IETF meeting I would record the appearance, behaviour, conversations, discussions, and other aspects of the day-to-day work in the IETF. My online participant observation primarily consisted of following mailing lists and interim meetings. While conducting online participant observation, I would write bi-weekly memos about the content and context of the discussions, the participants, and the volume of emails exchanged.

Mailing lists are ‘asynchronous Internet forums based on the concept of threaded conversation, using the email address as the identification of the person’ (Hocquet and Wieber 2018, 40). They are the main medium, in addition to the face-to-face and online interim meetings, through which IETF standardisation happens. Anyone can sign up to an IETF mailing list and contribute to the conversation by sending a message to the list. The IETF, however, has a strict yet informal set of ‘netiquette’ rules that define behaviour on mailing lists.⁶⁴ I started my fieldwork by conducting participant observation of the human rights group’s mailing list and multiple widely followed IETF and IRTF lists, including the IETF general discussion⁶⁵, architecture⁶⁶ and meeting⁶⁷ lists and their IRTF equivalents.

As my fieldwork progressed, various technical discussions flared up within the IETF, mainly around several new protocols. I followed the human rights advocates as they ventured into the relevant IETF working group and subscribed to the associated mailing lists to keep track of their

⁶⁴ For the full RFC see: RFC 1855. *Netiquette Guidelines*. Sally Hambridge. <https://www.ietf.org/rfc/rfc1855.txt>. October 1995.

⁶⁵ For further information see: <https://mailarchive.ietf.org/arch/browse/ietf/>

⁶⁶ For further information see: <https://mailarchive.ietf.org/arch/browse/architecture-discuss/>

⁶⁷ For further information see: <https://web.archive.org/web/20200912222908/https://www.ietf.org/how/meetings/ietf-meeting-mailing-lists/>

work. As a number of advocates started to develop human rights protocol considerations based on human rights RFC 8280 for multiple ongoing IETF working groups, the mailing lists I followed grew from ten to about 20. Yet, given the advocates' shorter engagement in these discussions, I would mostly analyse mailing lists archives rather than actively follow the mailing lists' discussions in real-time.

Mailing list analysis is common among technology anthropologists (Baym 1994, 1998; Kely 2008), as is alternating between using these resources for archival and participant observation. Mailing lists reflect the nature of online communities by manifesting their cultures through email (Baym 1998; Hocquet and Wieber 2018). Participating on the mailing list allowed me to get sustained feedback on my research from the people I was working with. As Ten Oever, Milan and Davide Beraldo (2020, 214) mention, mailing lists are, 'a precious and surprisingly under-explored source of data about discursive and norm change as well as stakeholder conflicts and alliances [in Internet governance]'. I used mailing lists to ask clarifying answers about different subjects discussed, sometimes presenting my analysis of the situation. These interactions were a fruitful way of getting feedback on my work, as the IETF mailing list culture was based on the notion that the fastest way to get a reply is to say something transgressive or plain wrong.⁶⁸ Throughout my fieldwork, I used this feature of IETF mailing list culture to my advantage, by asking online questions that I knew went against the IETF's cultural grain.

Following

Given the packed schedule of the IETF's face-to-face meetings, it was sometimes hard to set up interviews and studying up meant I had limited opportunities for follow-up conversations. As such, I added the 'following' research participants approach (Burrell 2009; Marcus 1995) to my fieldwork repertoire. This approach expands on participant observation and encourages researchers to follow their research participants across different places to develop novel empirical insights. In the case of my research, I started using this method after the initial set of interviews in year two. It led me to new empirical insights and encouraged me to reconsider the main focus of my research.

I was initially concerned with how IETF participants understood, framed, and responded to human rights advocacy efforts. However, as my research progressed, I realised that my primary

⁶⁸ This motto is often attributed to Matthew Austern, an early Usenet adopter who was involved in the development of multiple coding languages.

focus on IETF elites at-large ran the risk of replicating the very cultural assumptions that I aimed to question: namely that technical expertise should be valued above other types of knowledge. My initial focus also reified IETF participants as the main drivers of standardisation, forgoing consideration of how the process was informed by a myriad of influences and people outside of the IETF. These influences and people might not be considered experts or elites by the IETF's standards but by focusing on the response of elite IETF engineers to human rights advocates, I was recreating the very hierarchy of power I aimed to critique.

The 'following' method encouraged me to focus equally on the IETF participants at-large and the human rights advocates in their midst. Advocates are still elites by many measures but were often at the bottom of the IETF's hierarchy. Following the advocates opened further access to their worlds, beyond what I gathered from the interviews. Starting my analysis from the human rights advocates allowed me to follow the eclectic path that led their work to become rejected from protocol design. The practice of following human rights advocates within the IETF took me to their kitchens, employers, Github repositories, funders, and families. Following them meant sharing in their misery when meetings ran late or when they missed the coffee and cookie break at IETF meetings when jetlagged (see Picture 5). I also shared their joy of finding a rooftop bar where local delicacies, as well as the latest gossip, were dished out (see Picture 6).



Picture 5: IETF Chocolate Chip Cookies. Author's picture



Picture 6: Rooftop Bar Debrief. Picture courtesy of Mallory Knodel

Following the human rights advocates helped me identify where to do further participant observation and who to interview next. It encouraged me to interact with human rights advocates' funders, academics who critiqued their approach, and allies and detractors in adjacent Internet governance organisations. As such, following complimented my use of participant observation.

Participant observation has multiple known limitations. It is time and resource-consuming (Waddington 2009). Furthermore, there are limitations surrounding entering and being accepted in a field site; changing the course of action due to your presence; informing all members of an organisation about your intentions; and double hermeneutics (Davies 1998; Jorgensen 1989; Taylor and Bogdan 1984). I mitigated the first two issues by my familiarity with the IETF and by carefully reflecting on my various modes of participation. The third limitation only partially applies to the IETF, as its comparatively open and transparent governance structure makes organisation-wide consent for research purposes less urgent. The last limitation of double hermeneutics will be addressed in the section on semi-structured elite interviews below.

Elite Semi-Structured Interviews

Throughout my fieldwork, I conducted 65 semi-structured elite interviews, 35 of which were with individuals directly engaged in the human rights work and 30 were conducted with people more broadly engaged in the IETF. This recruitment strategy allowed me to write about specific efforts in the IETF while incorporating broader conversations about Internet governance cultures and politics. The interviews lasted between 60 and 90 minutes on average. When possible, they were conducted face-to-face, often during IETF events. Various interviews took place at other Internet governance meetings, as these would often be less busy for IETF participants. Ten interviews were conducted online, given scheduling conflicts. I transcribed the recorded interviews and analysed them using manual coding as well as the qualitative coding software NVivo.

I did semi-structured interviews, rather than structured, to maximise the opportunity for my interviewees to provide insights into their world while keeping the conversation within my research parameters (Harvey 2011; Kvale 1996). In my research, I use the term 'elite' to refer to the participants' position within the IETF, their job titles in their respective organisations, and roles in the human rights group. Pinning down an exact definition of elite is difficult, as it is always tied to the context and network of social relations in any given field site (Forsythe 2002; Hertz and Imber 1995; Ortner 2010). As mentioned earlier, even within the context of the IETF, elite

can mean different things. Attending the IETF requires resources, therefore implying an elite status based on societal parameters such as income, education, and employment. Yet, within the IETF, many of the human rights advocates were considered non-elite and out-group, as measured against the IETF's standards of technical prowess, attendance, seniority, corporate affiliation and number of RFCs published. As such, my use of the word elite indicates the nature of the IETF's overall participant base and the nuances of social stratification within it.

My semi-structured interview sampling strategy was a combination of purposive (Guetterman 2015; Palinkas et al. 2015) and subsequently snowball sampling (Patton 2002). To assemble a list of potential participants for the purposive sampling, I drew from my prior experience, documents, mailing lists, and the 'following' research participants approach. I identified the most prolific contributors to the online and offline conversation and contacted them for interviews. I used my existing network, worked with insider references (Ostrander 1993) and made strategic use of gate-keepers (Harvey 2011; Richards 1996) to gain access to IETF leadership. Based on my participant observation and an initial set of interviews, I developed a further list of interviewees. This approach led to my first two rounds of interviews (a total of 30). For each of these interviews, I ended my interview by asking the interviewee to suggest other people they think I should talk to. Given the changing nature of my research focus, I approached some of the individuals I interviewed for my master's degree again for this project.

My snowball sampling approach yielded sufficient interviews to reach saturation (Fusch and Ness 2015; Guest, Bunce, and Johnson 2016; Saunders et al. 2018). At about 50 interviews, I achieved 'meaning saturation' (Burrell 2009, 194) as no new themes or categories emerged after this moment. I finally stopped at 65 interviews—likely beyond the saturation point of my project. I continued beyond saturation because, given the divisive nature of the human rights work and known difficulties of accessing elites (Kunda 2006; Richards 1996), I knew that I risked only gaining access to people either supportive or critical of the human rights work. As such, I continued after interview number 50. By interviewing a large group of people, I captured a broad spectrum of views on IETF culture and politics beyond its most vocal protagonists and detractors.

The 65 people I interviewed broadly reflect the demographics—gender, age, and affiliation—of the HRPC group and the IETF. I did not achieve an even balance along those axes in my interviews. About 70 per cent of the individuals, I interviewed identified as men, 30 per cent as women. Across my total set of interviewees, 80 per cent were white and 20 per cent people of

colour. My interviewees were predominantly white, male, from the United States or Europe, and technologically savvy. The lack of diversity of my interviewee pool is not a flaw in my sampling procedure, but rather a fact of IETF life (see IETF statistics in Chapter One). Artificially counterbalancing my sampling might have undermined my findings of the cultural consequences of the lack of diversity among IETF participants (see Chapter Five). Given the public nature of the IETF and its IRTF human rights group, if I were to provide a more detailed breakdown of the exact numbers (i.e., how many women I interviewed that worked in industry and had leadership positions in the IETF), my underrepresented interviewees could likely be identified.

It is important to be aware of the limitations of insights drawn from my interviews. The constructivist underpinning of my research means that double hermeneutics—the interpretation of the interviewees’ interpretations by the researcher—is a legitimate limitation. While difficult to prevent entirely, I tried to mitigate its effects through reflexivity and triangulation (Rubin and Rubin 2005, 335). My interviews reflect the subjective worldview of the interviewees, rather than an objective view of the world. Following the criteria for maintaining rigour in elite interviewing, as set out by Yvonna Lincoln and Egon Guba (1985), allowed me to ensure the quality of my theorising based on the data derived from this method.

Archival Work and Document Analysis

The Internet is strung together as much by paper documents as it is by bits and wires. Documents—mailing list archives, news articles, and RFCs—comprise a crucial part of the data collected for this research. In this section, I elaborate on my final research method: archival analysis (Dirks 1992; Hocquet and Wieber 2018; Ortner 2010). As elaborated earlier, I included an analysis of IETF archives given their crucial role in the functioning of the organisation and the Internet’s infrastructure.

While not traditionally associated with ethnography, in this section I outline and justify my use of this method. Archival work helped me understand the history of the IETF. My archival work is tightly coupled with document analysis, as much of the Internet’s history is carefully documented. These documents are social artefacts that offer information about IETF culture, social practices, and protocol design. IETF RFCs, its website, and guiding documents inform its participants and ethnographers about how the organisation wants to be perceived (Bowen 2009; Bryman 2008; Denzin and Lincoln 2000), issues of concern, and institutional mechanisms.

Studying archives and documents helps anthropologists, as Kely (2008, 114) describes, benefit from the online ‘archival hubris’ created by technology communities like the IETF.⁶⁹ Since its inception, the IETF has thoroughly documented its conversations and controversies, creating an extensive body of documents and archives; the RFC series alone currently surpasses 8500 documents⁷⁰ and the IETF runs more than 180 mailing lists. The volume of documents is such that one academic spent four years systematically going through all RFCs published between 1969–2009 (Braman 2011a, 2011b, 2013).

Document analysis has long been part of Internet governance research (Abbate 2000; Braman 2011a, 2011b; Hocquet and Wieber 2018; Milan and Ten Oever 2016; Niedermayer et al. 2016). It refers to the ‘systematic procedure for reviewing or evaluating documents—both printed and electronic (computer-based and Internet-transmitted) material’ (Bowen 2009, 27) and serves multiple purposes. It can be used as a stand-alone technique (Merriam 1988) to inform the development of research questions (Goldstein and Reiboldt 2004). Document analysis can also provide additional data to understand the impact of outside events or developments (Yin 2003), or to reconcile contradictory findings. In this project, I used IETF archives including documents for these three purposes.

For my work, the method of archival and document analysis provided insights into the evolution of human rights across the IETF and the role of cultural forces therein. Specifically, this method allowed me to capture the evolving strategies of the advocates and the resistance of the engineers. Archival work also iteratively informed by my interviews, participant observation, and subsequent document analysis (Bryman and Burgess 1994). The overall corpus of archives and documents I assessed consists of mailing lists discussions, IETF policies, Internet Drafts (I-D), RFCs, company documents (such as budgets), articles written by IETF participants⁷¹, Github repositories, and discussions on social media. I added a variety of data sources because, as Merriam (1988, 118) notes, ‘documents of all types can help the researcher uncover meaning, develop understanding, and discover insights relevant to the research problem’. Together, I used this data to critically assess the statements made in the interviews and my insights from participant

⁶⁹ As part of this dissertation’s political project, I have also attempted to add to this archival hubris by archiving the majority of the documents and online resources that I reference with the ‘Internet Archive’, a non-profit dedicated to preserving online information by archiving copies of it. For more information on their work see: <https://web.archive.org/web/20210310102530/https://archive.org/web/>

⁷⁰ For further information on the entire body of documents see: <https://web.archive.org/web/20210204000411/https://www.rfc-editor.org/retrieve/bulk/>

⁷¹ Various news outlets, including CircleID and The Register, often report on the IETF.

observations. The tensions, disparities, or contradictions between these sources of information provided the ‘thick description’ (Geertz 1973) I needed for theory development.

Given the voluminous history of the IETF, I had to carefully select which documents and archives to include. It is important to be open about the process underlying these choices, as it gives insight into the robustness of my data and findings (Guba and Lincoln 1994; Lincoln and Guba 1985). For my archival analysis, I followed a similar sampling strategy as I did for my interviews. I started with purposive sampling and moved from there to snowball sampling, based on the interviews and literature review. It might seem unusual to describe a text-based sampling strategy as a ‘snowball sampling’. However, the IETF’s documents make up a web of interconnected and self-referential documents. I initially read all the documents produced by, and mailing list of, the human rights group, the various foundational IETF and IRTF documents newcomers are encouraged to read, and the RFCs referenced in the documents produced by the human rights advocates—totalling about 200 documents.

I used my interviews as an opportunity to obtain recommendations about further documents to examine. As I rounded off each interview, I asked my interviewee for three documents they thought were crucial to the IETF. Combined with my review of documents, I assembled a corpus of over 500 relevant documents, including RFCs, Github repositories, and online blogs. My data collection captured multiple unusual social artefacts, like memes, poems dedicated to the IETF, and even conference puns (see Picture 7). I relied on multiple information management software systems to order and analyse the data contained within, including Zotero, Devonthink and NVivo.

Overall, the archival work and document analysis facilitated my data analysis because I could compare information in the public sphere against the more intimate insights from interviews. Rather than taking a traditional view of documents as electronic or paper-based pieces of text, I applied the earlier mentioned ‘eclectic’ approach (Collier 1993) to document analysis.



Picture 7: Pictionary Wordplay Conference Room Name. Author's picture

There are many advantages to using archives and document analysis (Bowen 2009, 31), but the method also has drawbacks. It provides only limited details and documents can be difficult to access. There is a risk of bias both on the part of the organisation publishing them and in the selection by the researcher (Yin 2003). The first source of bias was not an issue for this project, as I was specifically interested in these culturally situated beliefs on the part of the IETF. But the second was. I tried to mitigate this selection bias by discussing the documents and my findings drawn from them with my research participants and other researchers, as well as comparing documents with existing literature. I tried to address the influence of my curation by being explicit about my document selection methods as well as by triangulating the data across different sources and informants.

Coding Research Data

Coding qualitative data is similar to developing ‘running code’ for the IETF. At its core, it is about defining the relationships between different concepts such that they provide insights into the functioning of a system, whether between machines or humans. As one of my interviewees told me, ‘you read and write for a living as a grad student, so this [running code] is just more reading and writing, what is the difference?’ The difference between IETF coders and ethnographic coders is that we are explicit about the political lens we apply in the process.

How ethnographers code depends on the lens we use to approach the coding process. My data coding was an iterative rather than a linear process. I analysed data from my archival and participant observation to inform my interviews (Aberbach & Rockman 2002). Conducting additional interviews sharpened my understanding of the IETF and clarified what themes to look for in my data. The insights I gained allowed me to formulate answers to my research questions rooted in the categories of analysis used by my research participants. For the analysis, I used a mix of the coding, category handling, modelling, and writing models as defined by Johnny Saldaña (2015). This combination of coding techniques allowed me to dynamically develop theoretical insights. My overall data corpus was based on the data gathered from the three methods elaborated in the previous sections.

Throughout my analysis, I used data triangulation (Denzin 1970), which encourages the use of multiple sources and forms of data collected across various groups, events, moments, and locations. Triangulation strengthened the ‘credibility’ of my research by showing that my findings held up across different sources, and were not merely the result of choices I made in my research methods and analysis (Patton 2002). Triangulating helped me ‘corroborate findings across data sets and thus reduce the impact of potential biases that can exist in a single study’ (Bowen 2009, 28) and strengthen the robustness of my findings (Goldstein and Reiboldt 2004). I applied it throughout my research, particularly in the beginning, when I was establishing the central themes of my research, and at the end, to corroborate my findings.

4.6 Reflections on Positionality and Ethics

On a balmy afternoon in Singapore, I was meeting a senior IETF member, a man working for a hardware company, for an interview. He held a senior position in his engineering team and several IETF leadership positions. We had never met in person. Yet, as I waited near the busy IETF registration desk, unable to pick him out of the crowd, he—without missing a beat—walked up to greet me. I was taken aback by the certainty with which he introduced himself. With my hair tied back in a ponytail, no make-up, jeans, and an IETF hackathon t-shirt, I thought I blended in. He registered the surprise on my face and said: ‘No offence, but it was easy to spot you, you stick out like a sore thumb. You’re too uhm... pretty for the IETF’. Not sure what to make of this personal comment, I used it as an entry point into our conversation about what the face and the culture of the IETF ‘look like’.

At this moment, as in many others, my appearance influenced how my interviewees perceived me. This vignette emphasises how my various identities—woman, young, white, and anthropologist—influenced how IETF members read me. My experience as being marked an ‘outsider’ helped me reflect on coding and being coded. In particular, revealing my uncomfortable experiences in IETF is a way to discuss how my positionality influenced this research. In qualitative research, positionality and ethical considerations are inherently tied to the overall research approach (Davies 1998; Forsythe 2002; Macbeth 2001). In this section, I will elaborate on how they influenced my research.

Positionality

The critical constructivist foundation of my research has repercussions for how I come to my overall conclusions. Because the meaning that individuals give to the world is socially constructed, my identity, values, and life experiences enter into that process. Rather than seeing myself as neutrally writing about the IETF from an impartial perspective, my research methods place me within the network of relations I studied. That is, I became an integral part of how knowledge about the IETF, including its culture, is created.

Where possible, I leveraged the various parts of my identity that made me ‘stick out’ from the organisation’s crowd. As a young woman, I stood out in the IETF. Its population is ageing, a trend visible in my fieldwork data, the number of self-proclaimed ‘greybeards’ attending the

IETF, and the frequent obituaries shared on the IETF's mailing lists.⁷² The organisation lacks an influx of young people, who often, as one of my interviewees joked, 'would rather do sexy work, like apps'. Another remarked that 'this is no place for green engineers', referring to the fact that many companies sent seasoned employees to the IETF. They could do the politicking as well as the engineering needed to 'get work done'. Being what one of my interviewees mistakenly guessed as 'probably younger than the Internet' thus set me apart. In practice, this meant my research participants often considered me to be inexperienced and unknowledgeable. I used this to my advantage by channelling their instincts to explain things to me, gathering useful information.

My gender was even more salient than my age. As mentioned, it is hard not to notice the gender gap in the IETF. The IETF's official statistics show that, on average, only about 10 per cent of its participants identify as women. A gender gap is also evident from participating in the meetings and reflected in the pictures included in this chapter. Being a woman marked me as a minority. My gender exposed me to some of the rough edges of IETF culture that perhaps a male researcher would have been shielded from. My experiences ranged from being mistaken for 'a partner to an IETF engineer' to being subjected to unsolicited sexual advances. Being exposed to the sexism in the IETF was not fun but could be informative. In Chapter Six, I use these experiences to articulate the cultural currency of a distinctly white, male, Euro-American approach to engineering in the IETF. As a woman, I also found that many of my women interlocutors were comfortable sharing their experiences of sexism with me. They told me things that they had not brought up when previously interviewed by male researchers, or even with their male peers.

While my gender and age made me stand out, in other ways, I blended in with the crowd. Like many of my interlocutors, I am white and European. IETF members were also comfortable with me because I spoke fluent English and have lived in the United States and am familiar with the country's politics and culture, which dominate the organisation. Most of my participants felt we shared a common cultural background. This also meant they were unguarded in expressing their concerns about, for example, the 'influx' of Chinese companies into the IETF. My interviewees were also at ease making jokes about the accents of Southeast Asian engineers or dismissing certain cities as 'too dangerous' for IETF meetings, based on racial stereotypes. The racist

⁷² See for example this email about the death of Peter Kirstein in January 2020. <https://mailarchive.ietf.org/arch/search/?q=peter+kirstein>

connotations of these comments speak to the Euro-American makeup of the IETF and are part of my appraisal of its culture as conservative.

Throughout this chapter, I have discussed my prior experience and professional affiliations (OII master's degree student, human rights organisation employee, and DPhil researcher) I held while participating in the IETF. In the first two years of my dissertation research, I undertook several paid research jobs for various civil society organisations, but these did not include work in or related to the IETF but focused primarily on Artificial Intelligence (AI) governance. Throughout my fieldwork, I made myself available to various civil society organisations working on issues of human rights and Internet infrastructure. I organised workshops⁷³, facilitated meetings and even co-published books⁷⁴ with civil society representatives working in Internet governance. This engaged research path was part of my critical approach, which encouraged me to look for ways to bring my research findings back to communities of practice, including policymakers and civil society.

As the work of the human rights advocates progressed, it was increasingly dismissed by IETF engineers. At several points during my research, various senior IETF engineers showed actively hostile behaviour towards the human rights advocates. This behaviour ranged from raising their voice at them during working group meetings, undermining their reputation with IETF leadership, and denigrating their work behind their backs. Naturally, I worried that my professional background would hinder my ability to undertake this research. However, as my fieldwork progressed, I realised that my affinity with the subject and detailed first-hand knowledge of human rights advocacy work in Internet governance made me uniquely positioned to answer my research questions. I used what Marcus and Fisher (1999, 140) describe as the advantages of being my 'own informant' by relying on what I already knew and experienced in the IETF before my dissertation research.

⁷³ Cath, Corinne and Niels ten Oever. 2019, December. *Off the Beaten Path: Human rights advocacy to change the Internet infrastructure*. <https://web.archive.org/web/20201110183947/https://data-activism.net/2019/12/off-the-beaten-path-human-rights-advocacy-to-change-the-internet-infrastructure/>

⁷⁴ Knodel, Mallory, Ulrike Uhlig, Niels ten Oever, and Corinne Cath. 2020. *How the Internet Really Works: An Illustrated Guide to Protocols, Privacy, Censorship, and Governance*. Illustrated edition. San Francisco, US: No Starch Press.

Like Ho (2009), my engagement in different roles and previous employment for one of the organisations that was part of my field site meant I understood the human rights work, beyond what could be gleaned from participating in the IETF. For instance, I knew how the various civil society actors involved in the IETF's human rights work collaborated in other Internet governance forums, where their mandates overlapped and diverged, and how their search for funding sometimes made them competitors. This knowledge would not have been readily available to me without my background in human rights advocacy. For this reason, of the people involved in the human rights work, I was least inclined to take the premises of the advocates at face value. My critical approach also encouraged me to critique some of the theories of change and assumptions guiding the human rights advocates (see Chapter Seven).

To incorporate how my positionality shaped my findings, other than through triangulation, member checking (Creswell 1998, 381), by asking by research participants what they thought of my work, and continued feedback on my work from my research participants (Lincoln and Guba 1985, 301–314), I made reflexivity part of my praxis. To understand how my positionality mattered, I continuously considered how my various identities intervened in my fieldwork. Reflexivity refers to 'the recognition that the involvement of the researcher as an active participant in the research process shapes the nature of the process and the knowledge produced through it' (King 2009, 20). It enables ethnographers to consider how their presence in the field impacts their data and findings. Some crucial strategies I used included keeping a research log with personal reflections and observations, as well as discussing research experiences with other researchers to clarify the effects of my potential biases (Davies 1998). Embracing my positionality helped me understand how my background intersected with, and diverged from, that of my research participants and I used points of friction to deepen my understanding of the IETF.

Ethical Considerations

I faced multiple ethical issues which I will reflect on below. I will focus on my decision to identify the IETF, how I tried to protect the identity of my interviewees from unforeseen political developments (see Appendix II), and the power imbalance inherent in studying up. As the human rights work is ongoing and the IETF often at the centre of societal discussions about the use of the Internet's infrastructure for political means (Denardis 2009, 2014), there was always the possibility that my participants' view on research participation would change. Such a change of heart is especially likely in the case of elite studies where, as Hugh Gusterson (1997, 116) mentions, 'people's careers could be at stake'. Throughout my fieldwork, three people declined

to be interviewed. One cited concern about my ability to protect their identity, another declined without a reason, and a third never responded to my emails. No one retracted their interview after my fieldwork came to an end.

Most of my interviewees were comfortable being recorded after I assured them attribution would be anonymised, and the recordings were only used for my research purpose and deleted upon completion of my dissertation. Some interviewees were hesitant to be recorded, expressing concerns about their ability to speak frankly or openly question decisions made by their employers on tape. In these cases, I would offer to conduct the interview without recording it. Others asked for explicit naming of their organisation in relation to the human rights work, citing visibility and funding opportunities. However, to maintain consistency throughout the project, I decided to keep all quotes unattributed.

This approach might seem inconsistent with my decision to explicitly name the IETF and the IRTF's Human Rights Protocol Considerations' group in my work. However, this decision was made in mutual agreement with my participants. They were quick to point out that it would be hard to describe the IETF without either making it instantly recognisable or so vague that my work would lose descriptive value. Furthermore, given the IETF's open nature, the cultural currency of openness, and the role of openness in maintaining the IETF's legitimacy (DeNardis 2011), my research participants encouraged me to explicitly identify the organisation. Lastly, online queries connect my name to IETF mailing lists, which would complicate any attempts to anonymise or pseudonymise my field site.

Similarly, I faced ethical questions regarding how to label my research participants. Many of the individuals participating in discussions about human rights, at various stages of my fieldwork, took positions that can be characterised as advocating on behalf of human rights. Yet, throughout this dissertation, I only make an analytical separation between 'human rights advocates' and 'IETF engineers'. I did so by taking into account the following factors: where an individual was employed, how they approached and defined human rights, the consistency of their commitment to the human rights advocacy efforts as defined by its leaders, their commitment to the IETF's cultural practices (some of which are inherently incompatible with the human rights aims, see Chapter Five), and their self-identification across the span of my fieldwork.

These are not clear-cut factors, and I found that taking such a contextually driven approach meant that during my fieldwork, people changed categories. Although, in practice, it was rare for someone initially defined as an ‘IETF engineer’ to move to the ‘human rights advocate’ category. The other way around did occur more frequently, but this was also an effect of my evolving understanding of the IETF’s cultural commitment to a limited number of civil liberties and rights (i.e., privacy and free speech) as unreflective of a broad commitment to human rights values. There are many subtle differences between ‘IETF engineers’ (for example between those working for industry or academia) and between ‘human rights advocates’. I decided not to make further differentiation in these categories for privacy reasons, the ease with which painting these nuances could lead my participants to be identified being the primary reason. This means that the categories I apply to explain the different actors in this research must be seen as necessarily broader than is perhaps best for ethnographic enquiry.

Identifying the organisation I researched, also presented some difficulties in protecting the identity of my interviewees. In particular, I worried about ensuring that quotes from the mailing lists could not be tied back to interview quotes.⁷⁵ In practice, anonymisation of mailing list messages turned out to be less of an issue than expected, since what the interviewees told me in person sometimes directly contradicted their public communications. The seeming contradiction between their ‘on-list’ communications and in-person opinions about human rights became a leitmotif for Chapter Six. Where my participants’ comments in the interviews were similar to their opinions on the mailing list, I would often use them in the aggregate by saying: ‘a number of individuals argued that’—thereby obscuring the individual in a crowd. I also sought feedback from interviewees assuming they were best placed to spot any information that could identify them.

There is always a power imbalance between researcher and interviewees in terms of experience in the field, understanding of the processes, and engagement with the research topic (Kunda 2006). However, unlike the ethnographic fieldwork done in remote or marginalised communities, the power balance can often be inverted with studying up. In the pecking order of the IETF, I was often at the bottom rung of social status. I quickly identified some of the salient markers of authority in the IETF—like engineering skills, ‘rugged masculinity’ and seniority in the organisation—and realised I possessed few of them. However, as mentioned earlier,

⁷⁵ Given the lists’ open and accessible nature, a simple online search would reveal the sender’s name and employer.

throughout my research I carved out space for myself that allowed me to use my ‘otherness’ to my advantage. I will never become the researcher the IETF calls on when stuck in a protocol problem, but I did become the person they consulted when they were stuck with a people problem. This role allowed me to, as Gusterson (1997) encourages anthropologists studying up to do, build spaces where researchers and research participants can enter into dialogue.

However, the IETF seeing me as a collaborator led to another ethical concern: the extent to which my presence in the field changed the dynamics I was researching. During my fieldwork, I was asked to take an active role in various IETF processes and groups, including the IETF’s Ombud’s’ Team, which is tasked with addressing organisational harassment during the meetings and on mailing lists. I made myself available to discuss issues of harassment as they came up, relying on my knowledge of the academic literature to suggest possible paths the IETF could take. I was, however, careful not to actively steer those conversations. I turned down offers to formally join the various groups working on improving the IETF’s culture or training newcomers. In addition to the time commitment it would require, it did not seem prudent to take on such roles while doing fieldwork on organisational culture.

To ensure I considered the full breadth of ethical issues related to Internet research I followed the most recent ethical standards for online research set by the Association of Internet Researchers (AoIR) (franzke et al. 2020), as well as the research standards for ethical research set by the University of Oxford.

4.7 Conclusion

In this chapter, I explained how I undertook my ethnographic research on IETF culture and its politics through a case study of human rights advocacy in the IETF. As a cultural anthropologist whose work is rooted in critical constructivism, I applied qualitative methods—including interviews and participant observation—to answer questions around how organisational cultures in Internet governance shape the inclusion of normative values in technology design. Throughout this chapter, I have described my theoretical grounding, methodology, methods, and associated data sources, explaining their relevance in answering the questions posed. I have explained my field site selection and duration of my fieldwork, as well as its limitations. Additionally, I have

candidly situated myself in the IETF both in terms of my pre-existing experience and positionality. Finally, I elaborated on my ethical practices.

My in-depth ethnographic approach is suited to gain an emic understanding of the human rights advocates in the IETF and how they worked with, and sometimes against, IETF culture to meet their needs. I also explained how I developed my research methods and how these support my analytical framework of critical Internet governance that I outlined in my literature review chapter. My overall research approach enabled me to gather insights into how the engineering culture of the IETF influences the ability of human rights advocates to change its people, politics and protocols.

5. Protocol Culture: Send Conservatively, Accept Liberally

5.1 Introduction

Current academic work in the field of Internet governance barely touches on culture. When it does, as I illustrated in my literature review (Chapter Three), existing studies of Internet Engineering Task Force (IETF) culture tend to be overly positive. My work departs from this literature by critically assessing the exclusionary effects of IETF culture through its working practices and protocol politics. This chapter is animated by the following research question: What values, practices, and politics make up IETF culture? I argue that protocol politics render IETF culture in code, reconfiguring human and digital connections, to the exclusion of human rights concerns and their advocates.

Rather than describing IETF culture in positive terms like democratic, fair and inclusive—as various academics do (Abbate 2000; Bygrave and Michaelsen 2009)—I demonstrate that the IETF is isolated and conservative.⁷⁶ I argue that IETF culture makes its engineers averse to critiques of the human rights advocates and addressing organisational inequities along racial and gendered lines. From a public interest perspective, the IETF's dismissal of these issues is concerning as the organisation lacks external oversight and checks on its exercise of power that could protect the public from the adverse consequences of the cultural impulses that currently drive standardisation.

IETF culture is best captured in Jon Postel's Robustness Principle: 'Be conservative in what you do, be liberal in what you accept from others'.⁷⁷ Postel was an early IETF contributor and author of fundamental protocols including the Transmission Control Protocol (TCP). He meant his Robustness Principle to serve as a guideline for designing and running networks over TCP. This design philosophy encourages engineers to write software that is conservative in its adherence to technical standards, but liberal in its ability to receive non-standard conform input. I argue that these notions of conservatism and liberalism, contained within the Robustness Principle, function as social guidelines at the IETF. One engineer exemplified the principle's importance to governing social relations by stating, 'The corollary of the robustness principle ("Postel's law") when applied to human-to-human communication such as emails, Internet drafts and Requests

⁷⁶ As mentioned in Chapter Three, I use the term conservative following Green (2019a, 14) to refer to the IETF's desire to maintain the status quo of its technical and social functioning, rather than referring to political affiliations.

⁷⁷ RFC 761. *Transmission Control Protocol*. Information Sciences Institute University of Southern California. <https://tools.ietf.org/html/rfc761>. January 1980. Edited by Jon Postel.

for Comment (RFCs) [is]: Do not offend others, do not be easily offended'. The IETF's Robustness Principle, like many other IETF design principles, contains distinct politics of liberalism and conservatism.

In this chapter, I follow the example by Gabriella Coleman and Alex Golub (2008) who describe the prevalence of liberal thought amongst technology communities as a cultural sensibility, rather than a coherent guiding philosophy.⁷⁸ This liberal cultural sensibility influences the IETF's shared protocol politics, which I approach through its design principles and organisational narratives. I analyse the IETF's principles and narratives as politically rooted in American interpretations of individualism, voluntarism, civil liberties, and laissez-faire technology development. In the absence of a legal- or government-mandated set of principles, these protocol politics guide how IETF engineers settle disputes. In addition to influencing competing technical solutions, these politics also guide moments of social friction: including debates about political topics like sexism, anti-trust concerns, and human rights. I argue that understanding how protocol politics mediated these frictions provides novel insight into IETF culture.

I approach protocol politics through existing tensions between current scholarship on the IETF and my ethnographic findings. These tensions help me demonstrate the importance of anthropology to the study of infrastructural politics and culture in Internet governance. My research expands on the literature review outlined in Chapter Three—where I presented existing literature on the IETF's open standards and procedures as lacking insights into the exclusionary effects of its organisational practices—by considering how culture shapes, and is shaped by, IETF protocol politics. The IETF's conservative culture and liberal protocol politics cast doubt on positive academic appraisals of the organisation.

⁷⁸ Many legal and political academics would struggle to recognise the IETF's understanding of liberalism as fitting within the traditional political doctrine that values liberty, consent of the governed, and equality before the law. Yet, the guiding logics of liberalism were similar, since many in the IETF strongly valued the enhancement of individual freedom through technology. In a recent paper about Internet governance, Danielle Flonk et al. (2020, 366) describe this form of liberalism as rooted in the notion that the Internet is an 'emerging transnational space that should mostly be governed by private self-regulation based on voluntary participation and substantive expertise. Institutions should be flexible and stakeholder-based whereas the role of the state should be limited to providing security and enforcing hard rules when needed. Their social purpose is to encourage the development of the Internet as much as possible by giving individuals, firms and civil society organisations as much freedom as possible. Intergovernmental organisations are perceived as too status -quo oriented for achieving this purpose.' This particular cultural articulation of liberalism closely matches my findings of the IETF's commitment to, and articulation of, liberalism.

The exclusionary effects of IETF culture should caution the academics and policymakers who argue global governance should follow the IETF's blueprint (Hofmann 2007; Mueller 2010). Studying technical organisations from the ground up lets me show how the IETF's existing cultural dynamics often benefit only its most powerful participants. I locate these insights in anthropological literature about American and European open technology communities to draw more precise inferences about IETF culture, which is necessary to understand why its engineers eventually largely rejected human rights values.

This chapter is organised as follows. First, I introduce two important *Working Practices* that shape the IETF: confrontation and social networking. I explain how these practices purposefully hinder the participation of particular individuals—women, people from the Global South, and individuals perceived as ‘overly political’—including those introducing human rights values in protocols. Subsequently, I argue that the IETF's liberal *Protocol Politics* are enacted through its design principles of openness, interoperability, and permissionless innovation. I argue these principles foment the cultural inverse of their technical aims, revealing that the IETF's functioning is more reflective of its commitment to a liberal politics of individualism, voluntarism, and civil liberties than to notions of fairness and openness. In the proceeding sections, I introduce three dominant IETF *Organisational Narratives* about the Internet. I consider how engineers narrate their work through techno-optimism, individual participation, and market-driven technology development. These narratives reflect the protocol politics identified earlier and allow me to identify a fourth one: laissez-faire technology development. In the final section, I *Conclude* by situating my findings in the context of ongoing policy and academic discussions about Internet governance cultures.

5.2 The IETF's Exclusionary Working Practices

The IETF's network is not an easy one to connect to, because its culture is characterised by abrasive working practices and cabal-like social networks. In this section, I theorise how the exclusionary effects of the IETF's culture manifested through its (net)working practices. Specifically, I introduce two crucial IETF working practices: confrontation and hierarchical social networking. These working practices make participation in the IETF more difficult for a particular subset of people—women, Global South inhabitants, and human rights experts. Conversely, confrontation makes the IETF more accessible to the individuals who comprised

the majority of its participant base: white, English-speaking men, with technical backgrounds from Europe and North America.

I analyse how these two working practices render IETF culture visible in the normative actions for protocol development. My concern with working practices follows from my practice-oriented approach to studying culture, which considers what people do and the outcomes of their actions (Abu-Lughod 1991; Seaver 2017) (see Chapter Four). Through documenting the discriminatory effects of IETF practices in context, I reveal the ‘rough’ aspects of its day-to-day functioning rarely captured in current literature. I demonstrate how the IETF’s working practices are closely aligned with cultural practices of masculinity in technology communities of practice in Europe and North America, that value a detached, technical, playful sometimes irreverent and individualistic approach to work (Dunbar-Hester 2019; Ensmenger 2015; Hicks 2013, 2017; Reagle 2013; Tanczer 2016).

My findings emphasise the need for further ethnographic engagement with the internal dynamics of Internet governance organisations, as their lived politics and practices are unlike the laudatory descriptions advanced by many practitioners and academics. Such critical Internet governance research is needed to amend current theorising about the IETF and dispel of the notion that this standard-setting organisation should function as an example for global governance arrangements (Hofmann 2007; Mueller 2010). My research also has policy implications. By mapping the cultural terrain where the interventions of policymakers and civil society actors take place, I theorise such public interest interventions in terms of the unexpected cultural obstacles these actors face.

Loud Men Talking Loudly

A key working practice in the IETF is confrontation. IETF working groups are characterised by frank exchanges and robust conversations. As one of my interlocutors simply said, ‘Yeah, it can get a little rough’. When I asked another interviewee to describe the nature of the IETF’s functioning for me, he said, ‘Oh, as tough, it is harsh. People pride themselves in their rudeness’. The working practice of confrontation is meant to standardise individual behaviour, similar to how the IETF standardises the Internet. Being effective in the IETF requires the performance of a masculine, Euro-American approach to work that many minority participants found uncomfortable or morally objectionable.

Such practices impacted who could participate in technical discussions. Multiple ethnographers of open technology communities have demonstrated that this rough approach to engineering creates organisational cultures that are unappealing and hostile to women, people of colour, and individuals with explicit political agendas (Dunbar-Hester 2019; Ensmenger 2015; Reagle 2013). The exclusionary aspects of the IETF's confrontational working practices are reflected in the IETF's tradition of 'loud men talking loudly' (Cath 2020).

This working practice often arose in my interviews when I asked how the IETF worked and is also reflected in the organisation's 'archival hubris' (Kelty 2008, 114). The IETF's guidance document for newcomers, for example, warns that participants 'can sometimes be surprisingly direct, sometimes verging on rude'.⁷⁹ I attended multiple newcomers' sessions during my fieldwork and was surprised by the levity with which newcomers were ushered into the IETF's hostile working culture. Veteran IETF participants shared advice such as, 'Do not take it personally' and 'People are just very passionate' to deflect critical questions about the roughness of the IETF's working practices. One of my interviewees was a human rights advocate and relatively new to the IETF at the time of our conversation. She explained why this practice of confrontation was off-putting to her:

The thing they say in the newcomers' training, which is right up with the weird focus on wearing t-shirts, is that "passionate men like to argue loudly". And like to me, that is fucked up. Right? We should not be inoculated to that kind of behaviour, that is really clearly a symptom of a larger cultural problem and actually not something that you should be proud of. It also desensitises people already here, and new people, to abusive behaviour, basically.

Many IETF participants, however, insist that these acrimonious practices are crucial to developing good protocols because confrontation is seen as key to both the IETF's social functioning and the Internet's technical functioning. James Leach, Dawn Nafus and Bernhard Krieger (2009, 5) describe the salience of confrontation in the context of open source communities as a reciprocal dynamic because 'better software is seen as dependent on particular social practices and ideologies while these practices and ideologies are given salience by their success in fostering valuable production'. This connection between confrontation and code is visible in the IETF.

⁷⁹ For the full document see:
<https://web.archive.org/web/20210318203553/https://www.ietf.org/about/participate/tao/>

The practice of confrontation is socially and technically encoded in the IETF. Technically it allows for value ‘tussles’ to occur in the protocols as the IETF would not mandate how its protocols should be implemented. Enabling tussles, or conflicts, to occur in design means that implementers—like browser developers, network operators and telecommunications providers—could decide to skip parts of standards that do not suit their interests, at the risk of losing some functions provided by particular standards. By enabling implementers to configure protocols to their needs, rather than prescribing a single configuration the IETF allows companies to ‘vie to favour their particular interest’ through protocols (Clark et al. 2005, 462). According to multiple engineers who developed early networking protocols, such ‘design tussles’ are crucial to the Internet’s continued existence (Clark et al. 2005). Protocols need to accommodate for a myriad of interests and uses and IETF engineers believe that failing to design for the resulting tussles, or by dictating outcomes, would break the Internet’s technical architecture. These dynamics show that confrontation is deeply embedded in the IETF by being designed into the protocols’ blueprints.

Socially, accommodating for confrontation encourages disputes over diplomacy as a key working practice. This confrontational style is clearly reflected in the daily functioning of the IETF. Towards the end of my fieldwork, several human rights advocates reviewed a document for standardising how domain registries, the organisations tasked with managing the registration of domain names, verified registrants of domain names against local laws. In practice, such verification technologies are often used by governments to restrict who can register a domain name or publish websites. Domain name verification is one of the tools used by authoritarian regimes to silence dissent.

The advocates were concerned about this IETF document because they believed its implementation ‘provides filtering and censorship abilities (...), which are inimical to the registrants’ freedom of expression’. When the advocates shared these concerns with the IETF working group responsible for developing the document, they received this reply from one of the engineers, ‘Having reviewed the proposed text, I would encourage the working group to ignore it. It is unhelpful, tendentious and a distraction from the working group’s purpose. In the interest of not wasting any more time, this is my last message on the topic’. This disparaging exchange was one of many messages where I witnessed the IETF’s confrontational and detached approach at work. Its impact on the human rights advocates is especially acute, given that diplomacy is more common than disputes in their circles. One advocate explained:

And in terms of how that [confrontational approach] affects human rights, people that are much more used to a human rights policy advocacy space will be super offended if not completely turned off by that dynamic. And so maybe they are less inclined to engage in the IETF. I sometimes feel the same way, like really, I have to defend like, my character on mailinglists for you to listen to me? I am just going to pass. Hard pass.

This confrontational working practice impedes the participation of human rights advocates in the IETF because it runs counter to their expectations of an acceptable working culture. The disproportionate impact of confrontation on human rights advocates is further complicated by their demographic make-up, which included non-engineers, women, and individuals from the Global South. The impact of confrontation is especially visible in how contributions by women are received when they are not confrontational. One advocate was explicit when she said:

There is a lot of misogyny here. Which is not expressed, this culture makes it very hard to talk about that. We are talking about entities, we are talking about machines, and autonomous systems and so on, so the social things are “not a problem.” The women, the older women, are like men. They learned how to move their bodies like men, and they speak louder, it is interesting.

This quote demonstrates that women generally struggle in the IETF because its working practices are prejudiced against their participation. There are no formal documents that contain these implicit rules about the importance of a masculine attitude; women find out by existing within the space. I exemplified this dynamic in Chapter Four, where I recounted how one engineer identified me as ‘the anthropologist’ by how my appearance made me stand out from the crowd. It also happens in more blatantly sexist ways. Engineers chastise women for wearing makeup or formal wear and question their ability to fulfil IETF leadership positions while having children. The IETF’s working practices are enforced through this collective culture that categorised non-masculine work styles as deviant.

The unwritten nature of these cultural rules makes it hard to alleviate its most concerning outcomes, including overtly sexist and racist behaviour. Another woman explained this rough culture in terms of its effects on participants from the Global South. She told me how, during her first IETF meeting, she sought out women from her region. When she spoke to them in their shared language, these women baulked, urging her to switch to English. She recounted what the reluctance of these women signalled to her about IETF culture, ‘They are women, and they are from the South. But their logic is, the less you are what you are here [in the IETF], the better’.

The IETF's culture encourages its members to adhere to the standard set by its early architects and their masculine and Western approach to engineering.

Individuals who could not or would not perform this working style often left the IETF. Yet, their departure is not necessarily seen as a problem. Confrontation and a focus on technical work, in the eyes of many of the IETF engineers I spoke to, led to 'getting work done'. One senior IETF engineer said, 'If we become too sensitive, we cannot have the arguments we have to have. You know and if people are holding things back then you end up with all of this subterfuge'. This quote reflects the cultural currency of confrontation, as well as the conservative nature of IETF culture, which did not change in face of these exclusionary undertones.

I pressed my interviewees about the continued role of confrontation given its discriminatory effects. One senior engineer summarised what multiple people told me. He said, 'We don't have the resources to engage with the entire planet on the evolution of the Internet and talk people through why each individual idea is a bad idea. And so—making people put some effort into coming to us, is important.' Confrontation is not only about developing good protocols, it is also designed to deter non-incumbents from participating in the IETF—or at least from doing so with relative ease. Given the historically skewed participant base of the IETF (see Chapter One), this deterrence mechanism primarily impacts women, people from the Global South, and individuals with an explicitly political agenda like the human rights advocates.

Many IETF participants are aware of what confrontation means for who could participate and who could not. One European engineer told me, 'I think the conversation tone is very casual and pretty Western. So that's sort of makes it easier for the Americans and Europeans, it is where it comes from. Plus, it is English.' One senior IETF member explained that, 'it creates a bias, in some sense. It makes it easy for the Europeans and the Americans, and the Western cultures to participate. It makes it super hard for others.' These responses show how the IETF's working practice of confrontation reflect a culture that is inherently and purposefully exclusionary to the very demographic groups advocating for the inclusion of human rights values. The exclusion of particular groups of people is also visible in the IETF's second crucial working practice: social networking.

Social Networking

There is a discrepancy between how IETF participants describe their work and what they actually do. During my fieldwork, I 'followed' (Burrell 2009; Marcus 1995) some of my research

participants around at the meetings (see Chapter Four). When I asked them about what they did all day, they told me they were writing code to make standards interoperable. While writing code is certainly an important aspect of their work it is not the primary one that most IETF participants engage in through face-to-face meetings. Much of my participants' time is spent, as one British engineer called it, having 'corridor conversations'—or, as an American engineer said, 'boozing and schmoozing'. In other words, a key activity during IETF meetings is building a social network by drinking alcohol and generally having fun.

These social activities produce networks, but not ones that are enjoyable or accessible for everyone. These social events cater to the needs of industry representatives and are more accessible to Western men than to others. Social networking in the IETF often involves meeting at bars and drinking alcohol. For instance, when individuals are interested in starting new technical work, they often organise 'beer BoFs' or 'bar BoFs'. Such Birds of a Feather (BoF) meetings are informal gatherings where the organisers provide free drinks to entice people to provide feedback on their work. Another example in the IETF was the 'Scotch BoF'. These BoFs used to be invite-only and are meant for the individuals working on Internet Protocol version 6 (IPv6). Each attendee is expected to bring a bottle of scotch—preferably expensive, unique, or both. Booze and bars are so prevalent that other researchers have described their role in Internet governance as crucial for maintaining trust (Meier-Hahn 2015).

Rarely did these researchers cast a critical eye on who is excluded from these activities and their resulting social networks, even though these working practices are uncomfortable to various participants. One of my interviewees gave an example that encapsulates the exclusionary effects of social networking at the IETF:

Let me explain, these fierce competitors, like Comcast and Verizon, have to interconnect. And so, there are technical engineers from Comcast, and there are technical engineers from Verizon. And they go to these meetings and they drink beer. When Comcast is having a terrible problem, they can pick up the phone and they can call this guy at Verizon and say: "If my boss knew I was calling you, I would get fired. But can you do this for me? Can you route this traffic for me? Can I have this link for 24 hours?" And they would make it work. They knew who to call, and the reason they knew that is because they knew who to trust. And the reason, they knew who they could trust is because they had a social relationship with them.

This quote reflects the commercial appeal of drinking as well as the gendered nature of the resulting relationships of trust. Multiple interviewees had similar anecdotes. When discussing the

exclusionary effects of such malted meetups, one male senior engineer remarked, 'That's right. Women function there [in the IETF] very well, it's just that at the end of the day all the guys get together (...) and it's just not for most women.' These exclusionary effects of social networking practices at the IETF are a secondary concern to most engineers, compared to their primary purpose of building trust between competitors.

The irreverent lack of concern for how these working practices exclude capable technical individuals based on their gender or stakeholder group demonstrates whose contributions are valued. While the IETF describes itself as an open and accessible organisation, its working practices reveal a hierarchical structure that privileges Western men from industry. In the next paragraphs, I will explain the impact of this practice of social networking on human rights advocates.

Social networking at the IETF is influenced by economic dynamics. IETF engineers hold that their contributions are on their individual titles, which means that even though it is often their (corporate) employers who pay for their participation, engineers do not explicitly identify as representing their employers' perspective. However, during my fieldwork, I found that corporate affiliation mattered a great deal. The opinions of engineers working for companies that account for a large percentage of Internet traffic (like Google or Facebook) or are dominant in the browser market (like Chrome or Firefox) often decided heated technical arguments. One engineer I interviewed describes this dynamic as follows:

When I started coming, if [human rights advocate] of [organisation] speaks about something, that is a different perception than if [redacted] of Google says, "Oh yes, we are using QUIC to do all our video." And that is reasonable. Or if somebody comes talking about routing technology and they come from Cisco, then people will listen a little bit more carefully.

The importance of company affiliation put the human rights advocates at a structural disadvantage. Even though the advocates believe they represent all users, given each person has innate human rights, their organisations are not recognised as influential in Internet traffic terms. Their lack of clout makes it even more important for the advocates to engage in the various socialising events, which due to their in-crowd nature and masculine drinking culture are not equally accessible to all advocates. As one woman involved in human rights work told me, 'It is just uncomfortable to be in a room with literally hundreds of men and a handful of women, the drinking, the looks. It makes me feel, I don't know... out of place? Unsafe? Definitely weird.'

This quote reflects how the particularities of social networking in the IETF has a disproportionate impact on the efficacy of human rights advocates.

Some of my interviewees were perfectly comfortable with this ‘Old Boys Club’⁸⁰ culture of the IETF and even encourage it. As one of the engineers I interviewed said, when I asked him about opening up the IETF to newcomers, ‘I think the way to do this is you broaden your outreach, but you do not try to change the selection criteria. You just increase the likelihood that you will find people that will fit. As opposed to saying, we need to change as an organisation.’ Such statements are reflective of a broader belief in the IETF that the organisation should explicitly resist proposed changes to its working practices. Rather many engineers argue that the IETF should focus on finding more people who would fit its existing cultural mould. A good ‘fit’ in the IETF requires particular technical skills and personal traits. The term ‘cultural fit’, as various anthropologists have explained, leads individuals to choose people that resemble them (Forsythe 2002; Marwick 2013; Trawick 1992). As a result, it is more difficult for ‘misfits’ to succeed in the IETF, even if they have the required technical skills.

Some engineers do advocate for organisational change because they are concerned about what the current narrow cultural fit means for the future of the IETF. One engineer recalled a meeting where he was sitting on a podium facing the IETF community during its plenary meeting. Staring at the 1000-odd people in the room he realised:

If you sit upfront and look out at the crowd, what you see is a tremendous lack of representation: it is mostly old white guys. A lot of the IETF members are “greybeards”, and a lot of them are perfectly happy with the way things are because it works for them because the IETF is totally tuned for greybeards. But it is not tuned for women. It is not tuned for people living in Africa, for people in Australia. It is not tuned for people who have trouble following English.

This quote captures my main argument about IETF culture: it is optimised for a narrow set of white male participants from North America and Europe. The IETF’s working practices are narrowly aligned with cultural practices of masculinity in Europe and North America that value a detached, technical, playful or irreverent, and individualistic work ethic. The organisation’s

⁸⁰ Multiple interviewees described the IETF’s social organisation using this term. For example, one male IETF veteran told me ‘I think that it is still relatively an “Old Boys Club”. There are insiders, people who know how it works. And if you are not an insider and if you don’t spend a tremendous amount of money getting up to speed, you are at such a disadvantage. It is so opaque.’ This interviewee confirmed what others had told me in less direct ways: that the IETF’s social network was easiest to navigate for its senior male participants with industry backing and crucial to being effective in the organisation.

working practices hamper the participation of more diverse demographics and a wider set of political views on the nature of technical work. The IETF's reliance on masculinity and corporate affiliation presented additional hurdles for minority participants, especially those working on human rights. By documenting the IETF's working practices from the ground up, I argue that its culture complicates the inclusion of human rights values, which lead engineers to brand its civil society protagonists as cultural outsiders.

5.3 The IETF's Lived Protocol Politics

Protocol politics embody historically contingent cultural relations of power and authority in technology (DeNardis 2009). In this section, I describe what that power is by analysing the politics that drive protocol development at the IETF. I build on the previous section by reframing IETF culture through the lens of my ethnographic data to make the case that the protocol politics of the IETF are best understood as committed to American interpretations of individualism, voluntarism, and a narrow set of civil liberties. I do so by drawing from a central repository of IETF culture: its technical design principles for protocol development as understood by IETF participants.

I analyse three principles: openness, interoperability, and permissionless innovation. I chose these three principles because many of my research participants emphasised their importance and they are prevalent in the IETF standards discussions and academic literature. These principles guide IETF engineers and feature prominently in IETF documents and rhetoric, as well as in Internet governance literature (Abbate 2000; Arkko 2020; Brousseau, Marzouki, and Méadel 2012a; Brown and Marsden 2013; Clark 2018; DeNardis 2009, 2011, 2014; Mueller 2002; van Schewick 2011). They have also been discussed as the technical values that led to the Internet's proliferation (Clark 2018; van Schewick 2011; Zittrain 2008). Much like the Robustness Principle, these design guidelines are being held up by academics as reflective of the IETF's politics (Brousseau, Marzouki, and Méadel 2012b, 50).

This line of thought assumes that design principles are directly imprinted on protocol politics and IETF culture. In contrast, I demonstrate that these technical principles, when taken literally, are poor proxies for the IETF's culture. I argue that the technical principle of openness enables a social closedness, and interoperability reinforces the importance of only a narrow set of civil

liberties, focused on freedom from government surveillance. Permissionless innovation fosters voluntarism that creates a social inertia leading engineers to disregard the negative impacts of protocols. Unearthing the alternative protocol politics contained within these design principles helps me ground descriptions of the IETF in its lived politics and recast its culture as conservative and insular.

The contrast between existing knowledge about the IETF's functioning (see Chapter Three) and my findings accentuate the need for additional ethnographic research on Internet governance organisations. For their definition of politics, many Internet governance academics draw from Langdon Winner's fundamental work on the 'politics of artefacts' (1980). They apply his insights to the political properties and artefacts of Internet governance arrangements. For example, in her influential work on protocol politics, DeNardis explains how commercial and institutional power struggles constitute the IETF's protocol politics. In more recent work, DeNardis and Musiani (2015) discuss the increased politicisation of Internet infrastructure and how infrastructural artefacts (like protocols) reflect the politics of international institutions. They argue that these politics drive protocol design, intervening in legal developments as well as in online surveillance. This recent work on protocol politics is informed by the disciplinary traditions of international relations, legal studies, and Science and Technology Studies (STS). It primarily examines 'arrangements of power' in Internet governance without considering the role of the organisational cultural practices shaping protocol politics.

Understanding the IETF's culture and guiding politics from the ground up provides empirical insights into the crucial but often opaque processes that guide Internet infrastructure companies. I illustrate how protocol politics make engineers unresponsive to human rights concerns and unreceptive to efforts to make the IETF's culture more inclusive. Protocol politics lead engineers to focus on narrow technical fixes and eschew discussions of the social drivers that necessitate them. These findings build on my previous section by illustrating the normative force of the IETF's organisational culture as exerted through its Internet standards and their architects. In the next section, I introduce the design principles of openness, interoperability, and permissionless innovation.

Design Principles

Design principles outline the general rules that engineers follow when designing standards (van Schewick 2011). The politics underlying these principles act as a moral compass in technical

discussions over competing value and interests. They guide how the Internet's layers are organised, how information flows across the network, and what constraints it encounters. This means these politics directly touch on key questions of infrastructural power (like the role of opaque Internet companies in undertaking content moderation) because these politics shape points for controlling information online. The IETF's technical design principles are the result of human choice. They reflect the institutional values of technology communities (Dunbar-Hester 2019; English-Lueck 2002; Kely 2008; Marwick 2013) and structure their social worlds (Kely 2008). The IETF is no exception, and understanding what politics guide the organisation illuminates the human motivations defining the development of the Internet's infrastructure.

Openness

In this section, I outline how openness is understood and operationalised in the IETF to argue that this technical principle encourages individualistic social behaviour. The open nature of the IETF's technical artefacts and design principles do not imply global accessibility. This intervention is necessary because the IETF's openness is often linked to 'the ideals of participatory democracy, open markets, individual autonomy, and social progress' (Rogers and Eden 2017, 804). These ideals are central to academic arguments about the IETF's exemplary governance model (Bygrave and Michaelsen 2009, 98; Mueller 2010).

Ethnographers of technology communities, however, have questioned the accuracy of this ideal of openness and whether it can foster more inclusive cultures (Brooke 2019; Dunbar-Hester 2019; Reagle 2013). Dunbar-Hester, for example, stated that it is naïve to believe that 'these communities are open in an uncomplicated way' (2019, 7). I take her statement one step further; not only is it naïve, but this flat understanding of openness conflates technical principles with organisational politics. This conflation overlooks the myriad of cultural barriers to openness in standards-setting organisations because it directs academic and policy attention away from these institutional obstacles.

In the IETF, openness refers to protocols being freely accessible, and its processes as being open and transparent (DeNardis 2011). This openness implies that anyone with an Internet connection could use protocols or participate in the IETF. For example, the 'about' entry of the IETF website states, 'The IETF has no formal membership, no membership fee, and nothing

to sign.⁸¹ As one of my interviewees cynically put it, ‘Any fucker with an email address can sign up and contribute to the mailing list.’ I argue that the IETF’s interpretation of openness reveals a political commitment to individualism. Their commitment becomes pronounced through engineers’ appraisal of individual action and independent thought, at the expense of inclusion and diversity efforts, which require collective effort and cultural change.

This commitment to an individualistic politics complicates the inclusion of a large number of potential contributors. The exclusionary effects of these politics affect who could attend IETF meetings. The IETF’s three-yearly face-to-face meetings rotate across Europe, North America, and Asia. Travel and lodging costs are often prohibitively expensive for individuals from the Global South and people who lack sponsorship by (corporate) employers. Likewise, many Global South participants experience travel and visa restrictions. As one of my interviewees—a human rights advocate from South-East Asia—said:

They do not realise that, for example, I have to apply for a visa a month in advance for every IETF meeting. I have to give a book full of documents, I spend a whole week just getting my documents straight, and then spend the better half of a day at the visa centre which has I mean, I won’t even start ranting about that, but even just the fact that they don’t realise that this is the global reality is the extension to protocols itself.

In this last sentence, my interviewee implies that the IETF is only as open as its awareness of the social barriers many participants face and that its protocols are only as accessible as the people able to contribute to their development. In practice, access to the IETF and its protocols is much more limited than academic research suggests. Some Internet governance academics mention these barriers (Brousseau, Marzouki, and Méadel 2012a; DeNardis 2009, 2014) but do not theorise their exclusionary consequences as grounded in the IETF’s institutional politics. By contrast, I found that IETF engineers tend to discuss overcoming social barriers to participation as a matter of individual responsibility, rather than a collective concern for the organisation to address.

Favouring a liberal freedom of action for individuals over collective interventions is part of protocol politics. During my fieldwork, institutional efforts to improve cultural openness were limited. The people I interviewed were aware of the structural and social barriers to participation. Yet, given the technical openness of the IETF, they dismiss these barriers. In the words of one

⁸¹ Internet Engineering Task Force. *Participate in the IETF*.
<https://web.archive.org/web/20191010055952/https://www.ietf.org/about/participate/>

senior IETF engineer, 'Perhaps you mean that we have barriers to entrance that produce an exclusive club. However, of all the standards organisations, the IETF is by far the most accessible by any and all measure.' Another similarly dismisses concerns around the lack of accessibility, 'So, uhm. Is that fair, no? Can we solve that problem, I don't know? I am willing to let that one go because if someone can solve that problem [of accessibility], they have done something much more significant than fixing the IETF.' Hence, the technical openness of the IETF's protocols, mailing lists, and conversations do not imply the community is open and accessible to all those interested. Nor can this technical openness be read to argue that the IETF is 'fair and democratic'.

Yet the relative openness of its protocols and communication channels is seen as sufficient by many of its engineers, and some academics, even when confronted with the organisation's lack of global representation and gender inequity. Such exclusionary dynamics relate to academic discussions about how protocol politics shape engineers' responses to matters concerning 'the public good', like diverse representation in Internet governance. The technical principle of openness makes IETF participants complacent about changing social barriers that restrict access to the organisation. The reasons underlying their complacency are predominantly about individualism. Engineers take openness to mean that individuals facing such barriers should overcome them independently, rather than expecting the IETF to collectively reduce them. That is, the IETF's interpretation of openness comes at the expense of enabling inclusive participation.

Individualism also inhibits the ability of engineers to adequately discuss the public interest or be held accountable for their decisions, which would require the IETF to be easily accessible to public interest defenders. By discussing the design principle of openness as it manifests in engineering practices, I paint a picture of the IETF as exclusionary and unwilling to accommodate the diverse needs of its potential participant base.

Interoperability

Interoperability refers to the ability of disparate networks to exchange information and make use of it (Abbate 2000, 5). How the design principle of interoperability takes shape in the IETF reveals a distinct focus on civil liberties, as codified within the United States Constitution, that curb government infringements through a set of fundamental freedoms like protecting freedom of speech. When faced with the negative ramifications of their design, these politics encourage

IETF engineers to focus on government surveillance of information flows rather than corporate surveillance.

These findings provide new insights into when organisations like the IETF are likely to respond to calls to intervene on behalf of the public good. Rather than supporting a broad set of values, as some academics argue (Rachovitsa 2016a, 2016b), the IETF's technical interventions are guided by a narrow set of politics rooted in an American interpretation of civil liberties. This particular dynamic becomes visible in ongoing discussions in the IETF. These discussions considered how interoperation should take place. Who should have access to what information, and under which circumstances, as it runs across different networks?

I draw from one heated discussion during my fieldwork to conceptualise interoperability as it relates to the questions posed above: the encryption of the Domain Name Service (DNS). This debate provides an example of the civil liberties politics contained within the design principle of interoperability. The DNS provides a foundational service to the Internet, it functions like a phonebook, connecting the human-readable names of websites to their Internet Protocol (IP) addresses so browsers can load them. IP addresses are persistent identifiers, meaning that they can be linked to devices or the individuals using them. For much of its existence, the DNS process was largely unencrypted, meaning it revealed valuable information about which websites translated to which IP addresses. Such information could provide details about someone's private life and political leanings. The Snowden revelations—which revealed the extent of online surveillance by governments—provided renewed momentum to ongoing IETF efforts developing protocols for DNS encryption (Bradshaw and DeNardis 2019).

These efforts were framed by my research participants as ensuring that DNS queries remained private from the governments trying to intercept them. This focus on privacy from governments, rather than the corporations that cooperated with them in surveillance efforts, demonstrating how the politics of interoperability are rooted in American notions of civil liberties. The current solutions proposed for DNS encryption continue to provide some corporate entities involved in the process with access to sensitive query information. DNS encryption and the immediate goal of 'keeping the government out', as one interviewee told me, 'is secondary to the risk of corporate snooping'. 'Besides', another senior IETF engineer sighed when I pressed him about this, 'that business model is out of scope. So, we focus on the technical fixes.' These quotes show that the IETF's design value of interoperability is committed to enforcing a narrow set of civil liberties.

These civil liberties are united by the IETF’s focus on the importance of freedoms from government interference, in particular the United States government following the Snowden revelations, and implemented through limited technical fixes, which only fleetingly engage with corporate surveillance and the business models that drive the Internet.

Permissionless innovation

A third key technical principle for protocol design is permissionless innovation. This term refers to the ability of any individual with sufficient technical skills to connect their network to the Internet, build applications on it, or innovate without needing permission from a central authority. Permissionless innovation is possible because of the Internet’s modular design. As I explained in Chapter Two, if each iteration of existing technologies required the entire network to change, it would be difficult to innovate.

I argue this design principle is rooted in an unspoken political commitment to voluntarism. Voluntarism refers to the lack of coercion involved in technology development and the devotion of its practitioners to ‘self-organising modes where participants determine their own paths through project contributions’ (Dunbar-Hester 2019, 51). Voluntaristic commitment is common to the open-source and hacking communities from which IETF culture draws (Coleman 2015; Dunbar-Hester 2019; Kelly 2008). IETF engineers believe the Internet works because people chose to innovate voluntarily rather than being forced by government or legal pressure.

The absence of force is crucial to IETF politics. Absence of force is defined by a lack of constraints on, rather than the empowerment of, individuals developing and implementing standards. The idea of voluntary connection is salient in the IETF’s unofficial mantra, ‘We are not the protocol police’⁸². This slogan implies that the IETF designs technologies following the principle of permissionless innovation: they would not prescribe how to innovate, or what products and services should be brought to market. The technical principle of permissionless innovation thus transposes voluntarism into protocol politics, making it a guiding value of the IETF. The cultural force of voluntarism becomes especially apparent when considering the social barriers to permissionless innovation and who encounters them.

⁸² This mantra runs so deep that in 2021, a number of individuals involved in the human rights work decided to publish an “April Fools” RFC—these are humorous documents aimed to make light of ongoing technical discussions—establishing The Protocol Police: <https://www.rfc-editor.org/rfc/rfc8962.html> this RFC subsequently was translated into a graduation gift for the author: <http://protocolpolice.net/>

Permissionless innovation erects various social barriers, similar to those I introduced earlier for the openness principle. The mastery of spoken and written English is necessary to participate in the IETF and came up repeatedly during my fieldwork. The human rights advocates invited Ramsey Nasser, a creative coder and artist, to speak at their group's meeting during IETF 95 in 2016. He discussed that building software and standards requires fluency in spoken English and writing skills in Latin character sets.⁸³ According to Nasser, large parts of the world were excluded from programming and protocols.

To make those people more included, he developed an Arabic script programming language named قلب ('Qalb' or Heart). Qalb worked as a contained conceptual art project. However, in his talk, Nasser showed that when used to build programmes, it regularly crashed because the larger environment could not handle Arabic script. He explained that this system's failure sent a clear message:

What all of these things do, is serve as a constant reminder, that anyone whose native language is not English or if we want to be broader than that is not Latin based, the emotional effect that that has on me and people I know, is that it serves as a constant reminder: this was not made for you. You are out of place. That is not the kind of democratising platform that computation of the Internet could be or should be.

Nasser shows that the voluntaristic politics of permissionless innovation fail to accommodate non-Latin scripts. The cultural assumption behind it—that as no one has taken on this issue through innovation this must mean there is no need to interact with or accommodate for such scripts—is inherently discriminatory. The problem of non-Latin character sets is well-known in the IETF, and people have been trying to develop guidelines for the internationalisation of protocols. The efforts, however, do not address the broader inclusivity concerns raised by Nasser and are hindered by technical backwards compatibility concerns and the lack of strong economic incentives (Mathiason 2008, 33–34).

Permissionless innovation does not mean the Internet is accessible for everyone because innovation is generally spurred by economic incentives rather than the public's benefits. Likewise, this principle suggests that anyone can act but it does not signal who is responsible to

⁸³ See here for Nasser's talk, starting at 10:00 minutes
https://web.archive.org/web/20201119133953if_/https://www.youtube.com/watch?v=FnOnZFaK0bQ&list=PLC86T-6ZTP5hKFWJ1NGW7QlzBEwdjjsZl&index=8&t=0s

act. Permissionless innovation can also lead to social inertia in areas other than internationalisation. Recall my earlier discussion about (the lack of) DNS encryption; one of my interlocutors gave an example of how permissionless innovation sometimes means obvious data leaks and other privacy concerns would not get fixed:

And the roadblocks for the Server Name Indicator (SNI) encryption,⁸⁴ at least initially, floundered on: “Well, we could do all this stuff, it’s a lot of engineering work and the data leaks in the DNS anyways.” Right? I can kind of understand that you don’t want to do a lot of work that isn’t going to solve the problem you are aiming to solve. At the same time, when people would go to the DNS working group and say: “Can we fix this?” and they would say: “Well, we could. But it’s an awful lot of work and the data leaks in the SNI anyway.” And I got kind of frustrated, and I was like, how do I convince somebody to pick up the ball and deal with it?

This example demonstrates how permissionless innovation disincentivises engineers from fixing obvious collective privacy concerns; they are seen as someone else’s problem. It also indicates that the politics of voluntarism extend to how IETF engineers think about their responsibility for the impact of protocols on society, making them unreceptive to considering these external effects from a perspective of the public good.

In this section about the cultural force of IETF design principles, I have argued that contrary to academic assumptions, the IETF’s principles of openness, interoperability, and permissionless innovation are not directly representative of its politics. The principle of technical openness encourages individualism, which makes the IETF community socially insular. Interoperability contains a commitment to a narrow set of civil liberties rooted in the United States Constitution, while permissionless innovation encourages a voluntarist engineering ethos that amplifies this politics through social inertia. Together, these principles cultivate the social inverse of their technical aims and reveal a set of liberal protocol politics.

5.4 Organisational Narratives in the IETF

How narratives about the Internet are deployed and operationalised to settle arguments within the IETF reveals how their underlying protocol politics encourage engineers to be conservative

⁸⁴ SNI stands for Server Name Indicator, it is an extension of the Transport Layer Secure (TLS) protocol. The privacy problem described in the quote refers to the fact that SNI would present the hostname for an outgoing TLS connection in cleartext, leaking private information about what hostname is being contacted by the browser.

in what they do, and liberal in what they accept. In what follows, I introduce how IETF engineers talk about the Internet. I highlight three dominant narratives that arose from my data analysis: techno-optimism, individual participation, and voluntary market adoption of standards. I examine these narratives and their underlying politics for their exclusionary effects. My analysis reveals that the organisation's protocol politics encourages the dismissal of discussions concerning political topics like human rights and attempts to explicitly address racial and gender-based inequities. The IETF's protocol politics are implicated in the perpetuation of internal inequality and the dismissal of human rights efforts. I argue that this conservative approach to engineering is 'a feature, not a bug' of the organisation's functioning—as it reflects IETF culture at large.

My research provides the first overview of the IETF's organisational narratives. The narratives that individuals tell about organisations provide an important window into the culture (Forsythe 2002; Spencer-Oatey 2008) of infrastructural companies and governance bodies. These narratives are often idealised versions of a community's history and culture (Coleman 2017) and reflect a shared set of politics. Given the limited ethnographic work on the IETF, most scholarly work has considered the IETF's politics without considering how historic or cultural factors figure into their creation. In what follows, I analyse how the IETF's narratives reflect the three politics identified earlier (individualism, voluntarism, and civil liberties), and add a fourth one: laissez-faire technology development. I argue that academics studying Internet governance should not hesitate to name such politics for their inequitable effects, even if they are part of the cultural canon of Internet governance organisations.

Techno-Optimism

Many IETF engineers stress the Internet's revolutionary promise. Their understanding of its role in society is grounded in optimistic appraisals of the network's ability to connect strangers, democratise access to information and increase individual freedom by reducing government control over free speech. This technology-forward, optimistic sentiment, which sees the Internet as an inherent good, also motivated early Internet architects (see Chapter Two). The deterministic legacy of this narrative remains visible in how IETF engineers talk about the Internet. As if quoting from Manuel Castells (2000), Yochai Benkler (2006), and van Schewick

(2011), my interviewees argue that the Internet enables ‘radical new forms of mass communication’, ‘spurs innovation’, and ‘democratises access to information’ by leveraging openness and permissionless innovation.

The liberatory potential of the Internet, several engineers argue, is only limited by the creativity of its users. IETF documents about its work also reflect this confidence in the Internet’s limitless potential. Its mission statement, for example, holds that: ‘The IETF community wants the Internet to succeed because we believe that the existence of the Internet, and its influence on economics, communication, and education, will help us to build a better human society.’ This breathless techno-optimism raises the question: for whom and by whom should this ‘better society’ be built?

The IETF’s narrative of techno-optimism obscures the homogenous make-up of the organisation. An average of only ten per cent of people identified as women in meetings during my fieldwork.⁸⁵ If the IETF was inherently open, why did so few women participate in the organisation? Techno-optimism provides a distinct answer to this question, which reflects the IETF’s conservative culture. Efforts to actively recruit more women in the IETF are often dismissed with phrases like: ‘We need to select for quality, not gender’ or the cruder and tautological, ‘If they were good, they would be here’. The technical openness of the IETF is seen as sufficient to encourage equitable gender participation. In the process, gender inequity is narrated as the result of women’s individual choices and capacities, rather than as a result of the structural and well-documented barriers that women in technology sector face (Abbate 2012; Hicks 2017) or the IETF’s internal functioning and culture.

By relying on techno-optimism to explain the community’s gender gap, my interviewees downplay the structural barriers that women encounter. In fact, many of my research participants fortify these barriers with their sexist interpretations that questions women’s suitability for standardisation work. This is how the IETF’s narratives of techno-optimism translate the protocol politics of individualism and voluntarism to IETF culture in exclusionary ways that put up barriers for particular minority participants. Many IETF engineers resist attempts by the human rights advocates to address these barriers. During my fieldwork, the advocates tried to change the IETF’s exclusionary working practices (mentioned in section 5.2), update the

⁸⁵ IETF website with the attendance reports, which includes data on the self-reported gender identities of participants:

curriculum for newcomer trainings, and encourage inclusive terminology in the ongoing RFC series.⁸⁶ These efforts were often resisted with techno-optimistic arguments.

Techno-optimism surfaces a strain of liberal idealism rooted in the deeply American idea that networked technologies would inherently lead to individual freedom and liberation (Turner 2010). Various ethnographies of open technology and hacker cultures (Coleman 2012, 2015; Jordan and Taylor 1998; Kely 2008) have revealed this articulation of optimism, as well as its flaws. Coleman, in her ethnography of the hacker collective Anonymous (2015), shows that in certain cases eclectic hacking collectives turned the Internet's optimistic promises into a progressive political movement. Recent research suggests that this promise has also spurred online right-wing and reactionary activism (Phillips 2016; Schradie 2019). This recent research shows that techno-optimism, in particular, when applied to the liberatory potential of the Internet, can obscure the role of social inequities. Ethnographies of open-source communities reveal how techno-optimism has let sexism and racism fester, as this optimistic lens hinders discussions of systemic inequality (Brooke 2019; Dunbar-Hester 2019). These dynamics relate directly to the IETF.

Suggestions to purposefully address gender inequities in the IETF make many participants uncomfortable. They question the need for what they see as 'forced diversification', which runs counter to their politics of individual freedom and choice. This conservative reading of techno-optimism syncs with what ethnographers of open technology communities have consistently found: technology's liberatory narratives mask hierarchies more than they reflect egalitarian governance (Coleman 2015; Hoffmann, Proferes, and Zimmer 2018; Marwick 2013). The resulting organisational cultures are likely to perpetuate and aggravate social inequities along gendered and racial axes while limiting efforts to address them. Taken together, I argue that these exclusionary dynamics makes the IETF an unsuitable blueprint for Internet governance and technology policy.

⁸⁶ Following multiple inclusivity initiatives in other open technology communities, two human rights advocates wrote an Internet-Draft (I-D) in the summer of 2020 outlining steps the IETF should make to change the language in its RFC series such that it becomes inclusive. The advocates specifically criticised the use of contentious terms, like 'slave' and 'master' in RFCs. The discussion was hugely controversial and debate about the draft is ongoing. The debate reflects the IETF's liberal protocol politics; various vocal engineers voicing their concerns in terms of freedom of expression and what one participant called the dangers of 'bringing the cancer of "cancel culture" to the IETF.' Knodel, Mallory and Niels ten Oever. 2020. *Terminology, Power, and Inclusive Language in Internet-Drafts and RFCs*. <https://web.archive.org/web/20210316042055/https://tools.ietf.org/html/draft-knodel-terminology-02>

Individual Participation

IETF engineers often told me that they participated in the organisation's standardisation work as individual engineers rather than as representatives of their employers. This organisational narrative of individual participation reveals the protocol politics of individualism and voluntarism. It also reinforces an organisational culture that enables engineers to maximise their individual autonomy while protecting corporate interests. These dynamics complicate the ability of civil society to hold infrastructural companies to account for their decisions.

The importance of individual participation permeates IETF culture. The IETF's website, for example, states that 'The IETF will always view you as an individual, and never as a company representative'. This narrative influences how IETF participants understand their work and guides how they comport and dress. The power of the narrative of individual participation is visible in the IETF's casual dress code. Most people, whether they were meeting in Bangkok or Boston, would wear jeans, a t-shirt (preferably one from the earliest IETF meetings they attended), and sturdy shoes or sensible sandals. They often carry their laptops in black backpacks stamped with their company logo—the kind with a laptop sleeve, and dedicated pockets for converters and cables. People wearing suits were largely absent from IETF conferences. Multiple interviewees told me that suits signalled that someone represented a company. 'It's a tell-tale sign they are here to sell you something', one interviewee said. To him, a suit means corporate representation rather than individual participation.

This narrative of individual participation reflects the importance of voluntarist and individualistic politics to IETF culture. In the words of one interviewee, 'Everyone values having the ability to get up and disagree with my colleagues at the microphone, right. I guess because we still think that that is what yields the best engineering results. It gives people the most freedom if they chose to harness that'. Freedom to act drives IETF politics. Clarifying the underlying purpose of individual participation, one engineer told me: 'Frankly, I also think that a lot of people prefer it this way. Like even if you are doing something here, you can criticise your own company'. This sentiment explains the benefits of the narrative of individual participation; it enables IETF engineers to push back on decisions made by their companies.

The traditional ‘hum’⁸⁷ that is used to make decisions in IETF working groups serves a similar purpose. Humming, instead of a recorded vote, allows IETF participants to disapprove proposals made by their employers in the relative privacy of collective resonance. It enables them to participate in the IETF as individuals rather than as corporate representatives. But why did the professional engineers attending a globally recognised Internet governance body with participants from the biggest Internet companies downplay their professional affiliations?

Paradoxically, the IETF’s narrative of individual participation persists because companies benefit from it. Individual, rather than corporate participation, shields engineers from anti-trust litigation and unwanted government interventions, which illustrates how the IETF’s politics are tied into the business logics fuelling the development of standards. A blog published by the organisation in the summer of 2020 explained, ‘IETF processes and procedures are particularly well-suited to mitigate competition law risks. IETF participation is free and open to all interested individuals. Participants engage in their individual capacity, not as company representatives.’⁸⁸ Various companies in other standards-setting organisations, especially those in the United States, have had their standardisation efforts challenged in competition lawsuits. ‘Some standards-setting bodies’, one of my interviewees told me, ‘now require you to sign a whole set of legal rights to participate and agree to avoid being seen as a cartel. They call them that.’ Similarly, another interviewee told me that, ‘It avoids the legal scrutiny in participation, it is just a bunch of engineers talking.’ This tight connection between the IETF’s functioning and business interests has direct political consequences for accountability efforts driven by civil society participants.

I found that the narrative of individual participation disadvantages the human rights advocates. Several of the advocates emphasised that this narrative made it hard for them to hold Internet infrastructure companies to account for pushing ‘bad tech’ into the IETF. These guiding politics put civil society at a distinct disadvantage because, as one advocate summarised, ‘There is even this sort of radical individualism. Right. Where if you speak at a mic, you are participating as an individual. Which I understand, but like who benefits from that right? Civil society does not.’

⁸⁷ Some IETF working groups measure consensus in a discussion by asking the group ‘to take a hum’, this involves the group humming on different proposals whereby the relative resonance of the hum indicates the group’s approval see: Ten Oever, Niels.

2020b. ‘HackCurio: Decoding the Cultures of Hacking’ (blog). March 2020.
<https://web.archive.org/web/20210118094039/https://hackcur.io/please-hum-now/>

⁸⁸ Livingood, Jason. 2020. ‘IETF Administration LLC Statement on Competition Law Issues’. IETF. 28 July 2020.
<https://web.archive.org/web/20201129074308/https://www.ietf.org/blog/ietf-llc-statement-competition-law-issues/>

The advocates' prefer a modality of action focused on working as a collective and by exerting pressure on the organisations (rather than individuals) behind a particular standard.

This narrative of individual participation also complicates the ability of advocates to call out engineers for holding views on human rights that are inconsistent with their corporations' official policies. As mentioned, various corporate players in the IETF have made explicit commitments to uphold the United Nations (UN) guiding principles on business and human rights (as developed by an expert team led by Harvard professor John Ruggie, see Chapter Three). Throughout my fieldwork, I saw that some of the engineers working for these same companies opposed the human rights work. Likewise, when the advocates wrote a controversial draft suggesting that the IETF should refrain from using offensive terminology in technical documents, many of the engineers working for companies that internally supported such efforts remained silent or pushed back. This included individuals from the companies who recently assembled a pan-industry collective to ban exclusionary and discriminatory language.⁸⁹

Both of these collective strategies of the advocates are complicated by the IETF's narrative of individual participation and its politics of individualism and voluntarism. The narrative of individual participation orients engineers to disregard corporate commitments to progressive values when working on IETF standards and muddles corporate accountability for infrastructural choices.

Voluntary Market Adoption

A third persistent narrative in the IETF is that the Internet's development is best guided by voluntary market adoption of standards—as opposed to through planned state interventions or regulations. Many interviewees told me that a standard's merit was defined by whether the biggest players in the market would use it. Previously, I argued that IETF narratives reflected the three politics initially identified in the above section on design principles: voluntarism, individualism, and civil liberties. In this section, I use the narrative of voluntary market adoption to include a fourth one: laissez-faire technology development. I demonstrate that this politics complicates the

⁸⁹ For further information on this initiative see: <https://web.archive.org/web/20210217115328/https://inclusivenaming.org/>

ability of advocates to organise their concerns around the human rights-eroding properties of protocols in ongoing technical discussions.

IETF participants consistently emphasise the importance of laissez-faire technology development for the Internet's evolution. This narrative is especially visible in the historic retelling of the IETF's relationship with its UN 'counterpart', the International Telecommunications Union (ITU), which is responsible for the standards and infrastructure for cellular networks and radio spectrum. The history of this relationship is adequately covered elsewhere (Kleinwachter 2004; Mathiason 2008; Mueller, Mathiason, and Klein 2007) but it bears repeating here in terms of the IETF's protocol politics. The ITU, so the story goes in the IETF, was late to the Internet. Once the ITU realised the importance of this novel network, most of its technical development was happening at the IETF and other private organisations. At several points, the ITU controversially tried to expand its mandate to include Internet standardisation. During the 2012 ITU-convened World Conference on International Telecommunications (WCIT), several ITU members made proposals that encroached on the IETF's mandate.

These proposals were seen as government-led attempts to undermine the IETF's work by moving standardisation to the ITU, thus shifting the Internet's governance model from being privatised to State-based. Interestingly, the combined pushback of the IETF, American companies, and the United States Congress prevented the ITU from moving forward with its plans.⁹⁰ The common denominator behind this pushback was the belief in the importance of laissez-faire technology development. This belief is so ingrained in the IETF's day-to-day functioning that phrases like 'That's what the ITU would do' or 'We are not the ITU' are commonly used to dismiss technical proposals, as well as human rights efforts.

The importance of laissez-faire technology development is also apparent in the IETF's market-based approach to quality control. This approach is summarised by Harald Alvestrand and Håkon Wium Lie (2009, 128) as: 'If it did not produce results that people thought useful, people would stop coming to the IETF and it would become irrelevant.' The compatibility of standards

⁹⁰ For details on WCIT 2012 see Kleinwachter, Wolfgang. 2012. 'WCIT and Internet Governance: Harmless Resolution or Trojan Horse?' *CircleID* (blog). 2012. https://web.archive.org/web/20210123120740/https://www.circleid.com/posts/20121217_wcit_and_internet_governance_harmless_resolution_or_trojan_horse and Mueller, Milton. 2012. 'ITU Phobia: Why WCIT Was Derailed'. *Internet Governance Project* (blog). 18 December 2012. <https://web.archive.org/web/20210122135212/https://www.internetgovernance.org/2012/12/18/itu-phobia-why-wcit-was-derailed/>

with ‘external social and political relationships’ of free-market capitalism have been carefully documented by various academics (Cohen 2019; Raymond and DeNardis 2015). Less often considered is the incompatibility between an adherence to laissez-faire politics and the ability of civil society to hold companies to account. I found that the calls of civil society to consider the impact of standards on human rights were structurally ignored by these technical actors, that were under no pressure to consider rights as part of their quality controls.

The advocates’ arguments that the human rights-eroding properties of standards should become part of the IETF’s quality control were dismissed as irrelevant. Through their dismissive attitude, combined with the lack of cohesion between corporate human rights commitments on paper and in protocols, the IETF engineers dismissed the human rights efforts. The IETF’s liberal politics justifying the engineers’ resistance to the advocates’ attempts to curb the IETF’s exercise of arbitrary power in discussions involving the public good, even if such efforts aligned with value statements of certain engineers’ employers. In my ethnographic interpretations of these organisational narratives, the IETF’s underlying liberal protocol politics shine through. Throughout this section, I have explained these politics in terms of their exclusionary effects for concerns raised by human rights advocates and the difficulties they encountered when trying to hold the IETF to account for its infrastructural decisions.

5.5 Conclusion

In this chapter, I have presented IETF culture and its politics, as reflected in the ‘Robustness Principle’: liberal in what they accept and conservative in what they do. I explain how understanding the IETF’s organisational culture provides deeper insight into the usually opaque human motivations that fuel infrastructural decisions to the exclusion of human rights values and their advocates. My insights provide new knowledge about the limits of the arbitrary exercise of power by Internet infrastructure companies. In the case of the IETF, its liberal politics mean engineers measure the quality of their work by market (rather than legal, ethical, or company) standards. Direct engagement by human rights advocates in the IETF is unable to move the cultural forces that support protocol politics. The efficacy of the rights efforts is further hampered by the IETF’s exclusionary working practices and organisational narratives.

I analysed the IETF through the protocol politics that define its culture. Specifically, I evaluated its working practices, design principles, and organisational practices from the ground up. In doing so, I argue that IETF culture is conservative rather than progressive. I introduced the IETF's liberal values-aligned protocol politics, including voluntarism, individualism, civil liberties, and laissez-faire technology development. These politics provide guidance for resolving social friction and steering discussions about equitable participation, inclusion, and human rights—often to the detriment of achieving progressive aims. The liberal bent of these politics explains why many engineers take conservative positions in discussions about refashioning the organisation's internal functioning. IETF engineers largely dismiss interventions and individuals that would make the organisation fairer and more inclusive. These cultural details explain how the IETF—and the human rights interventions to change the organisation—are tied up in a network of social relations and unspoken protocol politics.

My insights provided a novel perspective on current Internet governance research and policy by highlighting the connections between culture and code. By applying conceptual and methodological toolkits developed in anthropology to my data, I examined the cultural constitution of protocols. I did so by situating my findings in a larger body of ethnographic work on open technology cultures. This allowed me to show that IETF culture is aligned with other open technology communities whose political commitments hinder the inclusion of progressive values in technology development. In doing so, I connected the disparate literatures of Internet governance and anthropology to form a novel entry point into the analysis of human rights advocacy at the IETF. My approach critically examined whether an organisation that lacks gender diversity, encourages discriminatory principles, practices, and narratives, and whose engineers actively rebut diversity efforts should be lauded as exemplary of fair and inclusive Internet governance.

In 2019, a senior IETF engineer wrote a document on 'the harmful consequences of the Robustness Principle'.⁹¹ In it, he argues that while Postel's original principle enables interoperability in the short term, it negatively affects the Internet's ecosystem in the long term. The Robustness Principle is harmful, in his words, because it enables flaws to 'become entrenched as a de facto standard. Any implementation of the protocol is required to replicate

⁹¹ Thomson, Martin. 2019. The Harmful Consequences of the Robustness Principle. <https://web.archive.org/web/20210306182637/https://tools.ietf.org/html/draft-iab-protocol-maintenance-04>

the aberrant behaviour, or it is not interoperable.’ This particular flaw of the IETF’s guiding design philosophy is also visible in its culture, which similarly encourages and replicates such aberrant behaviour. In the next chapter, I build on these findings to argue that the IETF’s liberal protocol politics lead engineers to depoliticise their work and take a distinctly anti-political stance when discussing human rights.

6. Human Rights: We Do Not Do Politics

6.1 Introduction

The biggest impediments to the work of human rights advocates in the Internet Engineering Task Force (IETF) across the span of my fieldwork were not technical. The barriers were political—or rather, anti-political. In this chapter, I demonstrate that the anti-political engineering mindset in the IETF drives the engineers' rejection of the human rights work. I do so by answering the following question: What motivates IETF participants to take up or set aside human rights values? My participants express their concern about the human rights work in terms of the IETF's unofficial mantra, 'We do not do politics'. Many IETF engineers describe themselves as 'just engineers' who work on networking, routing, and other technical aspects of Internet standardisation. Others claim that politics exist in their work but don't have a place in discussions about protocols.

I use my findings to further underline the power of the IETF's informal politics and conservative culture (see Chapter Five), particularly for the ability of these cultural forces to render human rights values out of scope. IETF engineers conducting standards work operate within the confines of the IETF's conservative culture, which accommodates for a narrow set of procedural politics. In the previous chapter, I mentioned how concerns around the lack of encryption of the Domain Name Service (DNS) were a catalyst for the IETF to update various encryption protocols codifying its institutional commitment to privacy. However, the politics introduced by human rights advocates are not accommodated for in the same way.

In this chapter, I explain this dichotomy through the expressed attitudes toward the role of politics in Internet engineering. In discussions about politics broadly construed, the engineers display a distinctly anti-political orientation towards technology, rooted in their preferences for voluntarism, individualism, civil liberties, and laissez-faire technology development (see Chapter Five). I argue that this anti-political stance reveals the deeply political nature of IETF standardisation and explains engineers' unreceptiveness to explicitly addressing certain political values, including human rights. When discussing politics in the context of the human rights work, I show that engineers regard human rights as belonging to States and international governments. They see them as out of scope for—and potentially harmful to—the IETF's work. I demonstrate how human rights values are introduced, debated, understood, and eventually rejected, as they become embroiled in the IETF's anti-political engineering ethos. This ethos creates a cultural dynamic that encourages engineers to make certain values (e.g., privacy and autonomy) count,

while discounting others (e.g., human rights) in design. That is, the anti-political engineering ethos plays into the cultural work that makes some politics matter more than others.

In my analysis, I centre on sense-making, which I approach as the cultural process by which individuals give meaning to their experiences (see Chapter Four), as a source of knowledge about human rights advocacy in Internet governance. In doing so, I add empirical insights to academic debates about civil society's efficacy in Internet governance, as well as to discussions about the limits of international frameworks of human rights. Researching the sense-making processes of engineers is crucial to understand the political nature of IETF engineering and how its engineers' response to civil society interventions is guided by their anti-political mindset.

This chapter is organised as follows. In the next section, I detail the political nature of the IETF by showing the lengths to which its engineers go to depoliticise protocols by creating an artificial separation between their work and the world, which I term *Engineered Innocence*. Then, I introduce two common interpretations of politics by IETF participants involved in the human rights work, which reveal their *Anti-political Engineering* stance. Subsequently, I introduce how the debate about the role of *Human Rights* values unfolded in the IETF over the past six years. I show why these values, when mirrored on existing engineering practices and IETF politics, are eventually discarded: IETF participants are unwilling, or unable, to accommodate for politics beyond the IETF's procedural mechanics. Finally, I *Conclude* with the consequences of these findings for ongoing academic debates by arguing that the advocates and engineers alike are hamstrung by the IETF's protocol politics and cultural processes, which led to the breakdown of the human rights advocacy efforts throughout my fieldwork.

6.2 Denying Power through Engineered Innocence

'I am just an engineer'. This phrase is repeatedly invoked by the engineers I interviewed when I asked them about the social ramifications of their designs. By this statement, the engineers mean that their work is technical, not political. The central task of this chapter is to pick apart this notion of engineering as purely technical.⁹² I show why IETF engineers purposefully present their

⁹² This section 6.2 is primarily focused on the engineers' understanding of the political nature of the IETF, rather than the human advocates as their work was prefaced on the political character of protocols.

work as devoid of politics. I describe this denial of politics by coining the term ‘engineered innocence’—a deliberately and socially constructed position of blamelessness for the real-world consequences of decisions made within the context of technology development, in this case, of standards-setting.

I argue that this conservative⁹³ engineering approach captures the IETF’s cultural logic regarding the role of politics in engineering and reveals the inherently political nature of standardisation. In the previous chapter, I focused on the IETF’s protocol politics as visible in the ‘arrangements of power’ (Winner 1980, 123) contained in its design principles, organisational narratives, and working practices. This power is expressed in the ability of engineers to enact their values through the design of standards. I argue that engineers dismiss the role of politics in engineering to protect the IETF’s status quo, rather than reflecting a genuine belief that their work is apolitical.

Disentangling the engineers’ superficial apolitical stance from their deeper underlying beliefs about politics allows me to reposition the IETF’s approach to engineering as fundamentally anti-political rather than apolitical. In demonstrating that the engineers’ dismissal of politics is engineered rather than genuine, I push back on research suggesting that technologists are unaware of their power (Coleman 2004; Green 2019a). Doing so is important as engineered innocence is often invoked by technologists to downplay the power they have to safeguard it and rebuke calls for increased accountability of their work.

The engineers I observed regularly discuss the impact of their decisions in terms of power over who defines access to information and connection on the Internet. For example, one of the engineers I interviewed, said, ‘Many technical decisions can be very minor from an engineering perspective but do a lot to shift the power around in terms of who has access to what traffic’. Another engineer I interviewed mentioned a similar point stressing, ‘If you have a network, and you have people on the network, and whoever controls the network egress can determine who gets to see stuff. Or to communicate, or to make plans, or any of that. And I started seeing how the control over the information was at the same time a level of social control.’ Through these discussions about protocols, they fashion their work as inherently political and their position as one with direct power to influence the Internet’s infrastructure.

⁹³ As mentioned, for my definition of conservative I follow Green (2019a, 14) and I use the term conservative to refer to efforts of IETF engineers to maintain the organisation’s procedural and cultural status quo.

In the next sections, I consider IETF participants' attitudes towards the role of politics in engineering. When IETF engineers deny the evidently political nature of their work and the power their decisions hold, they do so by arguing that their protocols do not facilitate human-to-human communication. My interviewees publicly use this argument to claim their work is apolitical but in private they admit they recognise the political nature of their protocols. As such, I do not believe the engineers' political detachment is a neutral stance, as other academics have previously argued. Rather, it is the deeply conservative 'engineered innocence' that allows IETF engineers to dismiss calls by civil society to ground standards' work in concerns for human rights.

Daemonic Communication

The IETF's engineers structurally discount their individual contributions to protocols, seeing themselves as neutral facilitators. They cede their agency to the protocols, instrumentalising themselves, to the point where they lost sight of how their personhood is implicated in their work. In this section, I demonstrate how the engineers become the machine and take on its stipulated apolitical nature. Engineers' identification as politically detached neutral protocol arbiters, paradoxically, reveals the IETF's deeply political nature. To understand this process of depoliticising protocols, I will first reintroduce how protocols function.

A repeated argument many engineers use to dismiss the role of politics in standardisation draws from the technicalities of how protocols work. To briefly reiterate, while invisible for everyday users, the Internet consists of multiple layers, described by the IETF in various Request for Comments (RFCs).⁹⁴ Engineers sometimes use the four-layer model outlined in Chapter Two and sometimes draw from the seven-layer Open Systems Interconnection (OSI) model as a conceptual framework of how the Internet functions. The IETF's work focuses on layer three through seven, which are (from top to bottom): the network layer, transport layer, session layer, presentation layer, and application layer. These various layers require a shared language to exchange data and protocols provide the *lingua franca* for diverse systems to communicate across technical layers.

Because the IETF focuses on layer three through seven, many of the engineers I spoke with consider their protocols to involve 'the low layer, machine-to-machine Internet', rather than

⁹⁴ See for example: RFC 1122. *Requirements for Internet Hosts -- Communication Layers*. Robert Braden. <https://tools.ietf.org/html/rfc1122>. October 1989.

human-to-human, communication. This focus on machine communication is what Braman calls the IETF's focus on 'daemon users' (2011b, 300): the software and computational processes served by protocols. The primary role of protocols, as facilitators of 'daemonic communication', inversely means that many engineers understand protocols as not affecting humans directly and hence, as free from politics. As one engineer said in our interview:

So, for example if I am using Ethernet to carry Internet Protocol (IP) packets around, they are no humans at the Ethernet level. So, for the application layer, absolutely there are humans involved and I understand the human rights issues. But Transmission Control Protocol (TCP), either we get the packets, or we don't.

Politics, according to many IETF engineers, requires protocols to facilitate human communication. Engineers refer to this lack of interaction between protocols and people to make the case the IETF is devoid of politics. The 'daemonic' notion that protocols facilitate machine communication clearly influences the subjectivities of engineers. In one particularly heated exchange I witnessed during my fieldwork between a human rights advocate and a senior engineer, the engineer raised his voice and said, 'You keep talking about human rights but there are no humans [touched by my protocols]. Don't you see?' The human rights advocate got up from his chair, pointed his finger at the engineer and retorted 'Oh, is that right? So, you're like what? A Martian? It's you [name redacted], it is you. The human, it is you!' This altercation reveals the stakes in the debate about the role of politics in engineering between the human rights advocates and the engineers, the latter not willing to consider how through their design decisions their technical artefacts contain politics.

Such passionate exchanges notwithstanding, many engineers concur that protocols do not facilitate human communication. For this reason, they do not regard them as political. Politics was 'the stuff for humans by humans', as one engineer told me. Yet, there were multiple IETF protocols that *do* directly enable human-to-human communication. One example the human rights advocates use to push back on the engineers' rhetoric is the protocol for email. The Web-Real Time Communications (Web-RTC) protocol for browser-based, video-calling applications and screensharing is another protocol that directly enables human communication. However, even when the human rights advocates mention these examples of protocols that impact human communication, they are unable to change the dismissive tone of engineers debating the role of politics in engineering.

I argue the engineers' apolitical stance is one-sided, given the myriad of protocols that facilitate human connections. Their focus on the daemonic nature of protocols when discussing politics demonstrates the IETF's inherently conservative engineering ethos, which contradicts the engineers' self-presentation as a collective of supposedly objective 'just engineers'. The engineers' 'neutral' view is not a truly objectivist stance in the face of the value propositions inherent to standardisation. Rather, it shows their rhetorical focus on machine-to-machine protocols is a deliberate choice, an 'engineered innocence', meant to dismiss concerns raised by the human rights advocates regarding the unaccountable nature of their power and decision-making. The deliberate intent with which engineers dismiss politics becomes especially visible in the difference between engineers' public remarks and their private thoughts on the subject.

Fig Leaf Politics

There is a noticeable difference in the standpoint engineers take on public mailing lists and in public meetings, in comparison to what they told me in the relative privacy of our one-on-one interviews. In the IETF's public forums, the engineers stress the apoliticism of protocols. In confidence, however, many engineers openly acknowledge the political nature of protocols. When I asked them why they would not say so on mailing lists or during meetings, they told me they worried that stating that the IETF is involved in politics would undermine the laissez-faire, voluntarist nature of the organisation's work (see Chapter Five). One senior engineer told me during our interview:

So, for example, I agree it would be wrong for the IETF to start taking positions on economics. Saying that we need an anti-capitalist IETF would be kind of stupid, right?
Uhm. It's never going to happen anyways. So, for the credibility of the organisation, for its sponsors, for the people here who make use of the technologies developed, it would make no sense to do very overtly political things.

Stressing that these narratives of apoliticism are purposely deployed is important because it demonstrates that technologists are aware of the power contained in their decisions and can be held accountable for them. Purpose also accentuates the importance of sensemaking as a site of analysis in Internet governance organisations by showing that the meaning of the role of politics in the IETF must be approached empirically. In this section, I show how the IETF's engineering practices are political. These nuances are important considerations for how Internet governance cultures are theorised and the likelihood its standard-bearers are susceptible to civil society interventions.

Stating that the IETF does politics, as the quote above suggests, would undermine the IETF's authority. The derision of politics is not a flat belief in the neutrality of technology. Rather, it is an organisational self-preservation mechanism of what I termed 'engineered innocence'. This mechanism enables the engineers to create a sense of naiveté when the political and economic social orders shaped through protocols (and the benefits IETF engineers derive from them) become threatened. This apolitical rhetoric protects the stability of the IETF's current governance model and its liberal protocol politics (see Chapter Five). It allows engineers to abstract the political consequences of standards away from the IETF while justifying their reluctance to critically engage with social concerns, other than those contained in their conservative culture.

The protective utility of apoliticism comes up repeatedly in my data analysis. During the IETF 91 meeting, in the working group where the human rights advocates first presented their work, one engineer said:

We, as technologists, need to stop pretending that technology is a non-political decision. Every single time that you *choose* a protocol, that you *choose* to send a packet one place or another, every time that you decide on a language, or a stack, or an expression mechanism, or who the end-user is, or who your list of constituencies is, any time you make a decision you are making a political statement, and we need to keep that in mind. And we need to stop pretending that we are living with our nice little idyllic sterilised computer environment, that doesn't have to deal with all the squishy messiness of the real world.⁹⁵

Such an open admission of the inherent politics of technology, however, is exceptional. In public, many of the engineers I spoke to were wary of such statements. Yet, in private, many agreed with the sentiment conveyed in the quote above. This discord demonstrates the IETF's unspoken incentive structures that discourage engineers to claim politics. One engineer gave me a very concrete example of what could go wrong if the IETF becomes more explicit about the political dimensions of protocols. In our interview I asked him to sketch a worst-case scenario. He responded:

I think a really good example of what they are afraid of... hasn't happened yet [at the IETF] but is what happened at World Wide Web Consortium (W3C). W3C now has a competing standards organisation called WHATWG, that standardises another chunk of the web.

⁹⁵ IETF 91 Security Area Open Meeting (SAAG), working group, 01"28 min.
<https://www.youtube.com/watch?v=abmd1n5WUvc>

This engineer worries that being overt about the role of politics could lead the part of the IETF community that is uninterested in, or uncomfortable with, being explicitly political to establish a competitor. This could lead to a loss of talent, which would reduce the IETF's standing and relevancy. This existential incentive for collectively eliding the role of politics in the IETF drives the organisation's engineered innocence. As one engineer mentioned, 'I think in some sense it is also a fig leaf to say *we do not do* politics. Or we don't need to care about this. But we do *do* politics, we just don't tell anybody.' The engineers' hesitancy to speak openly about politics reflects broader fears of how being overt might undermine the IETF's standing, engineering community, and role in maintaining Internet infrastructure. These various incentives to stymie discussions about politics, fear of fragmentation and external governance, are all deeply political. The engineers' reasons for denying politics are also directly connected to spheres far outside of setting standards, demonstrating how the IETF is embedded in broader political structures of governance and capitalism that further mark the political nature of their work.

Hence, when IETF engineers argue they 'do not do politics', they are not espousing a naïve conviction in the neutrality of technology, or a sincere belief that they engineer 'by seeing everything from nowhere' (Haraway 1988, 581). The engineers I spoke to conscientiously frame their work as apolitical and daemonic to protect the IETF's credibility and liberal values. This suggests that IETF engineers, in contrast to what some academics argue, do not necessarily believe, 'they could, and should, devise technical definitions and assess protocol alternatives on the basis of technology with no consideration of subjective factors like culture or politics' (DeNardis 2009, 38). While there certainly are engineers for whom this objective approach is true, many employ it rhetorically to depoliticise their work to protect the IETF's status quo. The engineers' approach to politics is one of engineered, rather than actual, innocence. With the IETF's political nature examined, I now show how its engineers are anti-political by foregrounding the context of the human rights advocacy efforts.

6.3 The IETF's Ethos of Anti-Political Engineering

In this section, I explain what the term 'politics' means to IETF participants and why it makes them unreceptive to the subject matter of human rights. Previous literature ascribes the breakdown of the human rights efforts to its civil society protagonists (Mueller and Badiei 2019). In contrast, I argue that it is primarily the engineers' interpretations of the IETF's operating culture that hampers efforts to include human rights considerations. Earlier, I laid the groundwork for this assertion by unpacking arguments about the dismissal of the role of politics in engineering. Here, I further develop my analysis by introducing the IETF's anti-political engineering ethos as reflected in two dominant understandings of politics amongst those debating human rights: 1) politics as a statist political system and 2) politics as power over Internet infrastructure.

In what follows, I address this dichotomy in the expressed attitudes toward politics and illustrate both of these understandings reflect the IETF's anti-political engineering ethos, which I later claim positions human rights out of the engineers' view. The IETF's anti-political engineering ethos explains why the human rights advocates struggle to get their agendas included, as disavowing politics complicates the work of the human rights advocates. I use the definition of anti-political set out by James Malazita and Korryn Resetar (2019, 306), who research knowledge practices in computer science education, adjacent to those of the IETF. Malazita and Resetar argue that educational practices in computer science are, 'not apolitical, in that they disregard the political and dimensions of their work. Rather, they are anti-political, in that they acknowledge ethical and political dimensions, but to encapsulate and divest from "what counts" as within the bounds of computational aspects of sociotechnical systems and disciplines.' In my fieldwork, this definition of anti-political aligns with the dynamics I observed: IETF engineers acknowledge the political dimensions of their work in private, while purposefully dismissing it in public.

This anti-political engineering ethos runs counter to the advocates' approach that is prefaced on explicitly recognising that the IETF's work was value-laden and political. As one advocate explained on the mailing list at the start of the human rights work, 'Questioning the apolitics of protocols is really a fundamental goal of this work. I think while difficult, it would also be extremely productive to continue to engage with folks in the community who feel technology should strive to be apolitical, thereby developing a very strong counter-position.' Contending with the IETF's anti-politicism is clearly an important part of the human rights efforts.

The advocates feel it was crucial to politicise the IETF's work by encouraging its engineers to understand their protocols as political and regard themselves as responsible for the material consequences of their design choices. Most IETF engineers, however, strongly resist this attempt at politicising their work. Differing understandings of politics are contentious in the human rights advocacy efforts. In the words of one senior engineer, 'The claim in the [human rights] draft that is causing the controversy is that "protocols are politics by other means", that all protocol design decisions are necessarily political, and so on. If consensus is desired, that's the topic that needs to get sorted out.' As such, contextualising the engineers' anti-political attitude *in situ* is crucial to my overall goal of providing an ethnographic account of the role that IETF culture plays in its infrastructural politics.

Politics of States

Many IETF engineers debating human rights primarily understand politics as the arena of States and international organisations. IETF engineers, like their counterparts in other technical communities (Gürses, Kundnani, and Van Hoboken 2016; Myers-West 2018), harbour serious distrust towards political institutions. IETF participants are wary of statist politics, especially when applied to standardisation efforts. The IETF has historically resisted government attempts to build surveillance capabilities into its protocols (DeNardis 2009, 2014), which shows its long-running distaste for such interventions. I illustrate how the engineers' aversion for politics comes from their view of States as technically incompetent and divorced from the real engineering work that makes the Internet function.

Engineers pride themselves on their political distance. One of my interviewees framed this resistance to politics as, 'It has always been a unique thing that the IETF, in contrast to other standards organisations, has resisted the influence of particular States or agencies and this is also a unique thing. There are RFCs out there that say, we don't do any standardisation for surveillance techniques.' This quote reveals that IETF engineers do not simply see their work as different from that of state-led standardisation, but oppositional to it. Defining politics as the work of a political system in which the State has centralised control differentiates the IETF's laissez-faire approach from statist politics. Framing politics this way also serves as a point of pride, allowing engineers to juxtapose their technical acumen to the lack of technical expertise they associate with States.

Engineers use this political neutrality to protect the IETF and the Internet writ large. Many see the IETF as a protective force from statist politics, shielding the Internet from the adverse effects of regulation, government intervention and oversight. To the engineers, the IETF is uniquely positioned to protect the Internet, unlike specialised United Nations (UN) bodies like the International Telecommunication Union (ITU) or other political Internet governance bodies. The IETF's focus on the dangers of bringing statist politics to standardisation reflects the organisation's desire to stay independent.

The engineers' derisive notion of politics is driven by their persistent fear of being subsumed by other standards bodies, especially multilateral state-centric ones. As one engineer wrote to the mailing list, 'If we embraced that (plain incorrect) statement [that protocols are political] we'd risk ending up damaging our concept that good technical argument is what wins. While the IETF is nowhere near perfect in that regard, it seems to me far less imperfect than most other similar bodies and we ought to be careful to not damage that.' Framing their work as rooted in technical arguments is another way for IETF participants to protect the organisation's status quo and remain apolitical. This understanding of politics as statist relations frames engineers' aversion to being political and encourages an anti-political engineering ethos. Statist politics are seen by engineers as undermining the IETF's procedures and liberal protocol politics. This anti-political stance also drives the second notion of politics I identified: politics as infrastructural power.

Politics as Infrastructural Power

A minority of IETF engineers see politics as power over infrastructure: the ability of individuals or companies to shape protocol design in the image of particular desired outcomes, whether economic- or rights-oriented. These engineers focus on the ability of the IETF to define how information flows across the network through protocols, who controls that information, who can copy it, and who can block its transition. Examples of such infrastructural power include the ongoing efforts within the IETF to encrypt the DNS and amend other weaknesses in protocols (see Chapter Five). This is the power I described in earlier chapters as the material influence of the IETF's collective conceptualisation of the Internet (and its protocols) and the engineers' ability to recreate those in design.

Some engineers see this power to shape the infrastructure as an inherent aspect of standardisation, visible in the political opportunities made possible through their protocols. Engineers who understand politics as infrastructural power tend to be explicit about the social

consequences of their technical decisions, even though they would often omit their agency in the process of shaping standards. One engineer explained this view in detail by focusing on RFC 7844, which covers anonymity. He wrote to the mailing list that this particular RFC made a crucial difference for online anonymity because before the publication of this document:

There was no standard way to have “anonymity” with Dynamic Host Configuration Protocol (DHCP), people were forced to reveal things about themselves (there were even some data-leaking options which were mandatory, see RFC 4361, section 6.1, which made option “client identifier” compulsory). So, it is a nice example of how code embodies political positions.

The novel inclusion of this option for anonymity characterises the IETFs inherent politics and its power to shape the infrastructure. Another engineer made a similar comment in the context of a newly proposed encryption protocol, ‘It is unreasonable to believe that in selecting a protocol, you are not sort of forcing, forestalling, or making some options easier. That is a necessary part of it.’ These engineers acknowledge the politics of infrastructure because they believe doing so is what makes them good at their jobs. Understanding the different power dynamics at play in any given protocol and being able to influence the IETF’s process to their advantage are necessary parts of engineering at the IETF. Yet, the engineers would often talk about such human actions in terms of machine agency. One engineer mentioned the ability of protocols, rather than people, to influence economic outcomes:

Is this [protocol] going to create more consolidation of wealth in specific corporations? This is a real problem that we are seeing. We are seeing a little bit of that discussion in the DNS world now. Because there is a possible paradigm shift going on right now with DNS over HTTP, so this is going to be ... it is such a minor tweak technologically. From a technological kind of view, it is basically nothing, but people are very much keyed into the fact that this could change the relationship between people publishing information, the current intermediaries between all of the existing mechanisms and tools that we have. So, that is one example of where people are looking at the larger question of human rights. Only in the context of it shifting the power around.

This quote indicates what many academics studying Internet governance have found; while standards are not mandatory, they are political, because they shift power around in the Internet sector (Cohen 2019; DeNardis 2009, 2014; van Schewick 2011). But in their phrasing of where the power to change market outcomes resides, many engineers focus on the power of protocols rather than on the power decision making authority of the people that design them.

Many engineers who hold this notion of politics as infrastructural power, however, are hesitant to openly discuss their work using this language. Nor are they comfortable discussing it in terms of human rights. Their reluctance reflects the concerns introduced earlier regarding the impact of the overt acknowledgement of standardisation's political dimensions on the IETF's status quo. As one engineer mused, 'Part of it is, I think, a legitimate concern that we will be giving ourselves authority that we really don't have. That we will go too far out, and either, create a situation where there are unintended consequences or bad interactions with the law, or whatever.' The explicit discussion of politics is stifled by concerns about what it might do to the IETF's continued existence.

This stifling of politics echoes the engineers' associated fears that the IETF's work would be subsumed under a government agency if its engineers were to move away from their anti-political engineering ethos. In practice, these qualms mean that, regardless of their specific understanding of politics, IETF participants' first inclination is to devalue politics. The few individuals who do discuss them openly are unable to gain a critical mass of public support from the organisation to acknowledge the political dimensions of protocol design.

In analysing IETF discussions about the nature of politics, I have examined how its participants interpret and express politics in relation to engineering. My first reading focused on politics as belonging to statist governance systems rather than technical organisations like the IETF. A statist understanding discounts the inherent politics of protocols as arrangements of power. The second interpretation focused on politics as infrastructural power, which is explicit about the role of protocols in setting the standard for Internet infrastructure. Yet, many IETF adherents of this definition are unwilling to publicly discuss their work in such terms or acknowledge the role of individuals in shaping that power.

An anti-political stance is visible in the discrepancy between the IETF's engineers' public and private statements on the subject of politics within the context of human rights deliberations. It is also evident in how the IETF historically opposed statist intervention by translating its liberal protocol politics of individualism and privacy to standards' design, whereas politics lacking convergence with the IETF's conservative culture are not included in design. This social dynamic—acknowledging the role of politics in protocols while rendering them out of scope for ideological reasons—perfectly captures the definition of anti-political engineering introduced earlier (Malazita and Resetar 2019, 306) and reflects the salience of engineered innocence in the

IETF. In the next section, I build on these findings to argue how the IETF's anti-political approach to engineering made many engineers especially unreceptive to the human rights advocacy efforts.

6.4 Why Human Rights are Rejected

In this section, I argue that the IETF's anti-political ethos mediates how human rights efforts are perceived and explain why they are eventually rejected. My analysis starts with the founding of the Human Rights Protocol Considerations (HRPC) group in 2014 and ends with the completion of my fieldwork in 2020. The HRPC group is the home of the human rights advocates and situated in the IETF's research subsidiary: the Internet Research Task Force (IRTF) (see Chapter One). The conversations in this analysis include those within the IRTF and IETF as advocates and engineers discussed human rights over these six years, both online and offline. Through tracing this conversation about human rights, I show how IETF participants create distinct categories of what human rights encompass, and who its duty-bearers and rights-holders are.

The engineers argue that the IETF does not fit the category of duty-bearer under codified human rights law. I apply Bowker and Star's theory about the consequences of categories (2000) to argue that human rights standards—like network standards—create a distinct set of categories of responsibility, which influence how individuals act upon those categories. Here, the category of codified human rights leads to a perceived lack of responsibility for the impact of protocols on human rights, encouraging engineers to default to their anti-political engineering stance. The power of the IETF's cultural categories can also be seen in the consequences of the advocates' decisions to follow the IETF's strict procedures for publishing their RFC, rather than the more loosely defined IRTF procedures, which further complicates their work. In trying to emulate the IETF's publication procedures, advocates for human rights inadvertently tie their work to the IETF's anti-political engineering ethos and its cultural understanding of human rights as being out-of-scope for standardisation. These cultural dynamics play a large role in the overall dismissive response of the IETF to human rights work.

The cultural mediation of human rights is not captured in the current academic debates about human rights advocacy in Internet governance. Human rights, like most legal standards, are

contentious because their meanings are not fixed (Cohen 2019; Ten Oever 2020c). Likewise, the ability of human rights advocates to achieve their stated intent relies on how their human rights values are interpreted and by whom, as well as where they are implemented (Steiner, Alston, and Goodman 2007). Yet, most Internet governance research about human rights in the IETF does not consider these dynamics to be influenced by engineering cultures. Existing literature focuses on defining whether human rights advocacy efforts provide meaningful guidance to standardisation, or not (Bortzmeyer 2018; Carr 2015; Cath and Floridi 2017; Milan and Ten Oever 2016; Mueller and Badiei 2019; Rachovitsa 2016a; Zalnieriute and Milan 2019) (see Chapter Three). But this research often draws its conclusions without deeply considering how such rights efforts are mediated by governance cultures, overlooking a crucial aspect of their unfolding.

This lack of dedication to the cultural mediation of advocacy efforts is surprising, given the growing concern of Internet governance academics with how organisational values shape technology (see Chapter Three). The lack of cultural consideration also means that these academics tend to focus on the more visible motivations and actions of the advocates, rather than the engineers, whose drivers are often opaque and deeply embedded within the structures of their (corporate) employers that send them to the IETF—and as such harder to analytically access. I show that elucidating the engineers' views through interviews and fieldwork demonstrates how the human rights values, when viewed through the engineering mind, become aligned with the IETF's prevailing cultural convictions. To do so, I introduce various examples of how the IETF's culture, enacted by its engineers, mediates the human rights efforts through a conservative cultural frame.

In what follows, I present my participants' evolving understanding of human rights in three phases: I outline the *Catch-22 of Phase One* (2014-2016), the *Consequence of Legal Categories* apparent in Phase Two (2016–2018), and the role of *States, not Standards* in Phase Three (2018–2020).⁹⁶ In the initial phase (2014–2016) of IETF human rights advocacy efforts, the engineers' anti-political engineering ethos encourages a broad framing of human rights as including socio-economic and political rights. In the second phase (2016–2018), human rights are defined according to codified international human rights law. This legalistic turn leads many

⁹⁶ These insights draw from my fieldwork, interviews, as well as archival work, as this timeframe precedes the start of my master's degree fieldwork in 2015.

engineers to argue against the applicability of human rights since they do not consider the IETF a human rights duty-bearer. In the final phase (2018–2020), the tacit association between human rights and statist politics leads many participants to reject human rights efforts for fear they might undermine the IETF’s functioning. Subsequently, I analyse the negative consequences of the advocates’ explicit decision to *Play by the Book* of the IETF’s procedural rules, which further ties their work into the organisation’s anti-political ethos to the detriment of their goals. I conclude by putting these findings in the context of ongoing academic discussions about human rights advocacy in the IETF to argue these efforts are not a *Requiem for a Dream*.

Phase One: Human rights efforts lead to a Catch-22 situation

Between 2014 and 2016, the human rights advocates introduced their human rights concerns and document with rights considerations for engineers to follow. This introduction requires discussion of the definition of human rights, which initially focuses on two civil-political rights: freedom of expression and freedom of association. Freedom of expression and association are framed by the advocates as crucial, based on their ‘intuitive link’ to IETF work. This raises the question: intuitive for whom? The answer can likely be found in the origin of this particular focus. One of the founders of the human rights group works for a freedom of expression organisation that received a grant from the United States government to work on protocols and human rights. This grant provided the financial support to start the human rights group in the IETF. Given the remit of the chair’s employer and the requirements of his grant deliverables, the initial work focuses on the right to freedom of expression and access to information.

The focus on these two political rights is aligned with IETF’s liberal protocol politics introduced in the previous chapter. These rights are a natural fit with the engineers’ cultural affinity for civil liberties and familiarity with technical questions of privacy, freedom of expression, and access to information. The engineers are not just familiar with these particular rights but have a personal affinity for them, which comes up repeatedly in my interviews. As one interviewee told me, ‘When it comes to human rights, I tend to think of human rights, as you can imagine, from an American perspective. I am a freaking Yankee to the core, unfortunately.’ My interviewee qualifies this further by explaining that he is most comfortable discussing issues of privacy rather than social-economic rights because he understands the relationship between protocols and privacy.

Many of my participants mention they like civil-political rights because they are ‘negative’ rights, which they define as the right to be free from unwanted government interference in their personal life. This liberal view of human rights as freedom from interference shows up repeatedly in the IETF. As I have discussed in the previous chapter, it appears in protocol politics and ongoing technical discussions. An interpretation of rights as freedom from government interference is common in both the Internet sector and the digital rights community holding the sector to account (Dunbar-Hester 2019; Gangadharan and Niklas 2019; Jørgensen 2019; Myers-West 2018), and the cultural focus on privacy is well-documented in the IETF (Braman 2011a; DeNardis 2014, 2020; Ten Oever 2020a). What is remarkable, given this particular focus, is the following development in phase one of the human rights advocacy efforts.

As mentioned, much of the initial attention of the human rights advocates was on the right to freedom of expression and association. Early in phase one, however, industry engineers start to draw from the UN language on international human rights (see Chapter Three) to situate these international rights as interdependent and interrelated. As one engineer wrote to the mailing list, ‘I don't think the rights to free expression and free association can be cleanly separated from privacy. Privacy is an enabler of both free expression and free association, no? I agree that we should use “human rights” throughout.’ As such, these engineers argue, it would be difficult to justify focusing only on political rights, like freedom of expression. Various participants call for the inclusion of a broader spectrum of human rights. The sustained pressure from a small group of engineers leads the advocates to consider the full spectrum of international human rights in their main working document: RFC 8280 ‘Research into Human Rights Protocol Considerations’.⁹⁷

The inclusion of a broad spectrum of human rights seems contradictory to the engineers previously mentioned affinity for civil and political rights but can be explained by the IETF’s anti-political engineering ethos. In order for IETF engineers to weigh different values ‘in a neutral way’—as several of my interviewees said—they felt the need to include a comprehensive overview of rights. The participants stress the inclusion of the full spectrum of human rights, as an engineering requirement, to encourage impartiality. That is, as an engineering organisation, they

⁹⁷ In the introduction chapter, I introduced RFC 8280 ‘Research into Human Rights Protocol Considerations’ as the RFC developed by the human rights advocates in the Human Rights Protocol Considerations Group. See: RFC 8280. *Research into Human Rights Protocol Considerations*. Niels Ten Oever and Corinne Cath. <https://datatracker.ietf.org/doc/rfc8280/>. November 2018.

feel the IETF should not make a value judgement on which rights to include, and instead consider them all. By being inclusive, the engineers graft their anti-political approach onto the human rights advocacy efforts. Rather than arguing for the inclusion of rights based on political relevance, the engineers and advocates include all human rights because of engineering formalisms.

The engineers' anti-political approach, in turn, impacts how rights advocates frame their work. This shows just how dominant the IETF's organisational politics are in defining relevant engineering practices. Even the human rights advocates often define their work in technical terms. One advocate recounted what she told an engineer in an attempt to convince him of the relevancy of human rights:

Because ultimately, the goal is, and I should have said this much earlier on to him [the engineer], that this is a values trade-off in a lot of cases. When you look at, human rights considerations, what we are really saying is that we want you to consider the possibility that the values you have already identified may need to shift in light of other values, that are also important that you may not have considered so far, like human rights.

The process by which engineering principles, like value trade-offs, are used to make decisions about how to define human rights, is how the IETF's anti-politicism mediates human rights advocacy efforts. By speaking about human rights in engineering terms, the advocates put themselves in what one advocate described as 'a classic Catch-22'. Translating human rights in engineering terms enables the advocates to gain a foothold in the IETF. However, it undermines their efforts in the long term, as it integrates their work into the IETF's anti-political approach to protocol development that disincentives open discussion of overtly political topics.

Phase Two: The consequences of legal categories

Between 2016 and 2018, the discussion about human rights further focuses on how to define human rights. Throughout phases one and two, the engineers debate the difficulties related to developing human rights considerations for the IETF that shows their keen awareness of human rights as encoded in international law. For example, there was a comprehensive conversation about the tensions amongst individual human rights and the role of courts in resolving them. The engineers feel it is not up to them to adjudicate these legal values. The best they could do is to document the different human rights values at play within protocols, or as one engineer told me, 'It is a typical case where, two human rights, two perfectly legitimate human rights collide. How to resolve the tussle has to be a political decision, it is not a technical one.' The engineer applies

the IETF's cultural script of dismissing politics to rule out the engineers' ability to weigh in on human rights.

This process, by which IETF engineering principles—like value trade-offs and keeping their work globally applicable—are used by its engineers to make decisions about how to define human rights, is how the IETF's anti-politicism mediates human rights advocacy efforts, and how IETF culture keeps in place its infrastructural politics. In phase one, the discussion about human rights broadened beyond the two initially selected human rights (freedoms of expression and association) because engineers pointed out that the documents produced by the advocates state that they would cover *all* human rights but, in practice, the discussions only focus on a limited number. There is widespread concern that the advocates 'cherry-picked' particular rights when setting the strategic focus of the human rights work. To address these concerns, the advocates agree to define human rights broadly according to the UN Universal Declaration of Human Rights (UDHR) and its two main conventions on civil-political and socio-economic rights (see Chapter Three).

This UN framework for international human rights creates a distinct set of categories regarding duties, rights, duty-bearers, and rights-holders, paired with associated responsibilities and actions. From the perspective of many IETF engineers, the category 'human rights' only includes those rights codified in international law, which are not strictly applicable to non-state actors like the IETF. This narrow legalistic view of human rights has a resounding impact on the dismissal of the advocacy efforts. Multiple engineers argue that they do not consider human rights to apply to the IETF because it is not an independent legal entity.⁹⁸ This particular example emphasises how the international human rights framework works as a 'category' (Bowker and Star 2000) of human rights and, in the eye of the engineers, implies that its legal duties and responsibilities preclude the IETF. Engineers are also averse to claiming the responsibilities involved for fear that it would require them to turn the IETF into a state-run ITU like body, fundamentally upsetting their current self-regulatory governance model.

⁹⁸ At the time of this discussion, the IETF did not exist as a separate legal administrative entity. Rather, it existed as an activity of the Internet Society (ISOC)—an American nonprofit organisation. ISOC and the IETF in their early days had a mutually constitutive relationship, as ISOC was founded to provide an organisational home for the IETF, as well as make it possible for the IETF to receive donations and funding from various companies to organise its meetings. See also: <https://web.archive.org/web/20201108065011/https://www.internetsociety.org/internet/history-of-the-internet/ietf-internet-society/>

In the engineers' anti-political reading of codified rights, human rights do not apply to the IETF. Shortly after this legalistic turn, several engineers start to push back on the human rights work and continue to do so throughout phase two, drawing from their reading of human rights law as not applicable to non-state actors. These findings show the cultural consequences of the decision to define human rights as per the UN framework. Applying this UN label enables the engineers to argue that they are largely excluded from any enforceable legal responsibilities or duties. This dynamic explains how the IETF's conservative culture hampers the human rights advocates to broaden the organisation's infrastructural politics with those of human rights. The engineers' approach to human rights is defined by a narrow and legalistic reading of international law, which is out of sync with recent debates about legal responsibilities of the private sector (Alston 2017; Easton 2016) and moral obligations (Brown et al. 2010; Cath and Floridi 2017; Orwat and Bless 2016). The doubt that the engineers cast about the relevance of the human rights framework in phase two would continue to hamper the efforts in phase three.

Phase Three: States, not standards

During the debate about defining human rights between 2018 and 2020, tacit cultural associations between human rights and statist politics surface. These associations are linked to how many IETF participants equate human rights with government interference. This linkage leads a majority of the engineers involved in the discussion to argue human rights are the responsibility of States, not standards-setting organisations. Ensuing discussions hamper the ability of the human rights advocates to implement their human rights RFC. IETF engineers argue that the advocates have too blatant a political agenda for a technical organisation. They also start to purposefully use the human rights work to advocate for rights that are not in-line with those defined in the UDHR, to make their point that human rights have no place in the IETF.

In 2019, the first IETF RFC with a 'human rights considerations section' is published. In the text of RFC 8492, 'Secure Password Ciphersuites for Transport Layer Security (TLS-PWD)', the author writes that, 'At the time of publication, there was a growing interest in considering the impacts that IETF (and Internet Research Task Force IRTF) work can have on human rights (...). As such, the human rights considerations of TLS-PWD are presented here'. It reads:

The most fundamental of Human Rights is the right to protect oneself. The right to keep and bear arms is an example of this right. Implementations of TLS-PWD can be used as arms, kept and borne, to defend oneself against all manner of attackers—criminals,

governments, lawyers, etc. TLS-PWD is a powerful tool in the promotion and defence of universal human rights.

The template for the human rights considerations section is based on human rights RFC 8280, which contains rights guidelines for protocols as developed by the advocates. One of the main goals of the advocates is for all IETF RFCs to include such a section on human rights. However, RFC 8492 above conceptualises human rights as ‘the right to bear arms’, showing that including human rights values in the IETF can have unintended consequences when approached through the engineering mind.

These unintended consequences are indicative of the transformative force of the IETF’s culture, which enables engineers to read human rights through their preferred politics. The ‘right to bear arms’ is distinctly American, enshrined in the Second Amendment of the United States Constitution. The human rights considerations outlined in RFC 8280, however, are rooted in the UN UDHR, which includes no such armament rights. The use of human rights language for anti-government rhetoric in the IETF suggests engineers shape human rights values in the image of the organisation’s liberal protocol politics. RFC 8492 exemplifies this dynamic.

This example of how IETF engineers interpret the human rights efforts through their cultural frame and preferred politics hides their deeper concerns. The human rights advocates successfully published their human rights RFC in November 2017 and started reviewing ongoing standards work in the IETF based on its guidelines. This jump of human rights advocacy from the IRTF to the IETF worries my engineering participants: they express apprehension about how the broader Internet governance ecosystem, including States, would view the human rights work. One engineer summed up his concern as, ‘The ultimate enforcer of human rights is government. Nobody else can enforce human rights (...) So I am a little bit concerned that if they smell that this is happening here, they might come and you know, declare the territory.’ Engineers are dismissive of openly considering human rights in the IETF because they worry it would invite unwanted government scrutiny.

Human rights politics—as a centralised network of duties, responsibilities, and enforcing parties—does not neatly align with the IETF’s protocol politics or the Internet’s voluntarist laissez-faire design. In the words of another engineer:

I am not convinced human rights fits in the IETF. I am willing to be told otherwise, but when we talk about the political world of human rights, what comes to my mind quickly is the ITU or something like that, in which the question becomes, “Madame Chairwoman, I would like to speak about the gentleman from Slowbovia, who has just said something with which I disagree.”

IETF engineers perceive human rights as belonging to the realm of States. They openly express their disdain for such discursive politics and deliberation among officially appointed representatives. This state-centric view of human rights means advocacy efforts, by proxy, become laden with the negative connotations regarding States outlined in the previous section. This dynamic demonstrates how the human rights work is culturally mediated by the IETF’s anti-political engineering ethos to reflect the organisation’s protocol politics.

Many engineers are concerned about government interference. Human rights are seen as outside the IETF’s remit and more squarely within that of States, hence, the human rights advocacy work becomes increasingly viewed as a threat to the IETF’s status quo. Many engineers fear that including human rights might require the organisation to alter its existing working procedures by creating official channels for governments to provide feedback on protocol development or move the IETF in the direction of the state-run, multilateral model of Internet governance. As mentioned throughout this dissertation, such governance changes run counter to the IETF’s liberal protocol politics of voluntary network connection, laissez-faire protocol development, and personal liberty. The IETF engineers’ cultural sensibilities lead them to take a conservative stance and dismiss the human rights advocacy efforts which, when filtered through organisational politics, are seen as threatening to the IETF.

Playing by the Book

Throughout my fieldwork, the human rights activists draw upon IETF templates and processes to develop their work. This is notable because their initial institutional home is the IRTF, not the IETF. The IRTF’s rules for publishing RFCs are less stringent, and the human rights advocates worried this meant their work at the IETF would be seen as less meticulous. They took various steps to prove their work met IETF standards for rigour. Early on, the advocates modelled their work on existing IETF privacy and security RFCs and adopted IETF working group procedures to achieve rough consensus on RFC 8280. By the end of 2017, the human rights group had gone through the full procedural cycle of IETF activities; they developed a

charter, wrote an initial human rights Internet-Draft (I-D) complete with reviews of engineers who tested it against their protocols-in-development, and published an RFC.

Yet since its publication in late 2017, RFC 8280 has barely been used by IETF engineers not directly involved in human rights advocacy efforts.⁹⁹ This RFC is primarily used for purposes other than those intended by the human rights advocates, like pro-gun advocacy. For these reasons, I argue that, in the case of human rights efforts, process does not make perfect. The human rights advocates had hoped that drawing on IETF standards and procedures would confer legitimacy to their IRTF efforts. The human rights advocates are, to paraphrase Bowker and Star (2000), acutely aware of the pragmatics of the invisible forces of categories. However, instead of elevating the status of the human rights work, it is stymied by the IETF's anti-political engineering ethos.

When the human rights advocates started to work on their RFC, many engineers argued against the implied relationship between protocols and human rights. To make the work on human rights palatable to engineers, the advocates compare it to the IETF's security and privacy guidelines. Most notably, they equate the human rights efforts with established IETF privacy practices and build their RFC 8280 on the example of RFC 6973, 'Privacy Considerations for Internet Protocols'. This privacy RFC offers guidance on how to develop privacy considerations for protocols by documenting potential concerns. The human rights advocates' main point was that privacy is a well-understood issue, so the IETF needed to become better at understanding human rights. Yet, this focus on the lack of human rights considerations as a question of educating the IETF's engineering community elides the previously outlined cultural incentives that limit the engineers' willingness to take on human rights values in their work.

Nor does the advocates' approach of emulating the IETF help the advocates to devise strategies that allow them to push back on these various cultural hurdles. Quite the opposite, by framing the process of developing human rights considerations as aligned with, and building upon, the established corpus of IETF privacy considerations, the advocates tie their work to the organisation's established anti-political engineering ethos. They also bind their human rights RFC to the non-mandatory nature of the privacy considerations outlined in RFC 6973 on which the human rights RFC is modelled. RFC 6973 is not obligatory and does not enjoy widespread

⁹⁹ For an overview of the documents that include a human rights section see: https://github.com/IRTF-HRPC/reviews/blob/main/drafts_RFCs_with_HRCs.md

adoption: including a privacy section in IETF standards documents is encouraged but engineers are not required to write one.¹⁰⁰ While this privacy RFC provides a familiar template that supports the advocates' introduction of human rights values into the IETF, it also implicitly defines human rights considerations as optional.

As the human rights workers moved closer to publishing their RFC, a growing number of engineers voiced their concerns regarding the usefulness of the human rights document for 'real-world engineering'. To address these concerns, the chairs of the human rights group encourage engineers to apply the document to ongoing discussions in IETF working groups. Nine engineers respond to this call by testing the document to see whether its human rights considerations are useful. Their reviews of the human rights guidelines share critiques. All the reviewers indicate that applying the human rights considerations to their work is interesting because it opened their eyes to unexpected social impacts of their protocols.

Crucially, the reviewers disagree with the advocates about *where* in the Internet's stack human rights concerns emerge. In their reviews, the engineers argue that most human rights concerns they found arise from protocol deployment after they left the IETF, rather than their development in the IETF. Many also reiterate that human rights considerations are not relevant to them because their protocols facilitate machine-to-machine (not human-to-human) communication. This line of reasoning is similar to that given by many engineers when dismissing politics as only applicable to human communication (in section 6.2). As one engineer explained:

Well, in my RFC template when I am writing an internet draft, I have a security section, an Internet Assigned Numbers Authority (IANA) section, a privacy section, I have a human right section, and I have a standard section there that says: "This protocol does not deal with people and therefor there is no human rights impact", which I would be quite happy for someone to argue and explain how human rights impact it. I have read the RFC: No, I don't see it.

These reviews reveal that the engineers acknowledge the political impact of some protocols but saw human rights as outside of the remit of their 'daemonic' protocols. They argue that even if

¹⁰⁰ Even for the mandatory security considerations, the considerations text in standards documents is often brief and perfunctory. For a further detail on the limited effectiveness of security and privacy considerations see: Doty, Nick. 2020. 'Enacting Privacy in Internet Standards'. Ph.D. dissertation. University of Berkeley. Berkeley: USA. <https://web.archive.org/web/https://www.ischool.berkeley.edu/research/publications/2020/enacting-privacy-internet-standards>

their protocols include a human rights considerations section, protocol implementers independent of the IETF could still choose to ignore it. All of these dynamics stressing my earlier point about the inherent politics of standardisation at the IETF and the directive force of its culture in mediating human rights efforts. I asked one human rights advocate about the efficacy of the decision to apply the IETF standards for quality. ‘Playing by the book’, he told me with a sigh, ‘got us nowhere’. When I asked him why, he bluntly stated, ‘It’s not in their nature’. What he meant was that considering human rights was not part of the IETF’s engineering mindset.

Initially, modelling human rights work on existing work on privacy considerations provided the advocates with the necessary legitimacy to carry their work forward. However, as the work progressed, drawing from the IETF’s templates meant the advocates integrated their work into the organisation’s anti-political engineering. In the short term, efforts to include human rights values further sensitise engineers to these values. In the long run, however, the rights-advocacy efforts reinforce the IETF’s anti-political engineering ethos, preventing both engineers and advocates from making the cultural shifts necessary to introduce new values.

Human Rights in the IETF: A requiem for a dream?

My findings of the rejection of human rights values provide novel insights for ongoing academic debates about how human rights advocates shape Internet standardisation in the IETF. In Chapter Three, I outlined how recent literature ascribes the breakdown of the human rights efforts to its civil society protagonists (Mueller and Badieli 2019), calling their efforts ‘a requiem for a dream’. The human rights efforts, however, do the opposite of what this metaphor implies: rather than chasing unachievable dreams or going to great lengths to escape their surroundings, the human rights advocates squarely root their approach in the IETF’s reality. I argue that it is their close adherence to the IETF’s cultural rules, in particular its imperative of anti-political engineering, more than anything else that hinders the advocates’ efforts.

My ethnographic analysis explains how it is possible that the advocates’ visions for the future of the Internet stop short of truly rethinking the power dynamics that hinder the uptake of their human rights guidelines. I describe the IETF’s anti-political ethos as holding back both the engineers and the advocates when it comes to envisioning what protocols are and what they should be in terms of upholding societal values. The cultural imperative of anti-political

engineering constrains ongoing discussions about human rights advocacy in the IETF, such that the uptake of human rights work depends on how these advocacy efforts compliment or conflict with the organisation's dominant cultural understanding of politics.

As mentioned in the literature review (Chapter Three), the direct application of human rights law to non-state actors is complicated due to its multilateral state-centric nature and the non-binding influence of human rights law on the private sector. An additional obstacle I identify here arises from the cultural understanding of human rights in the IETF, in addition to the legal limitations of the UN framework. Human rights become another political artefact that, when filtered through the IETF's dominant cultural sensibilities, has unintended consequences. The unintended use of human rights values by engineers indicates that to understand the ability of civil society to shape standards and Internet infrastructure to become 'rights-respecting', it is crucial to approach these efforts from within their cultural context.

My findings re-emphasise the disconnect I identify throughout this dissertation, between the public and political commitment to human rights made by the IETF's key corporate players and the willingness of their engineers to act on those commitments in practice. I explain this unwillingness in terms of the IETF's guiding engineering ethos. I provide novel insights into what happens when human rights advocates heed the call of policymakers to apply human rights values to Internet governance. My findings suggest that the participation of civil society actors in the IETF provides a limited check on the organisation's accountability towards such commitments. These findings illustrate that additional scrutiny of Internet governance is needed that includes further consideration of binding human rights tool for the private sector.

6.5 Conclusion

In this chapter, I have examined how IETF engineers and advocates debate the role of human rights values in standardisation between 2014 and 2020. I argued that the inclusion of human rights values—when viewed through an engineering mindset 'tuned' to IETF culture—counterintuitively leads to the explicit rejection of human rights responsibilities. The extent to which advocates are able to align engineering and human rights values is limited by the IETF's procedural politics and anti-political engineering ethos, which leads engineers to discount the relevance of human rights. The advocates struggle to include human rights values as structural

engineering considerations because the system of connections underpinning legal code is at odds with the cultural codes guiding IETF engineers. The engineers see the human rights framework as applicable to individual humans (not machines) and as centralised in State authority with a rigid accountability hierarchy that precluded the private sector, including the IETF.

The engineer's desire to keep politics out of the IETF is a deeply cultural one. I have demonstrated the disjuncture between what engineers say and what they do, which highlights the need for further ethnographic enquiry of (human rights advocacy in) Internet governance. Such research is especially relevant to understand how personal motivations and organisational politics guide infrastructural actors' responses to calls for accountability. I explained the difference between engineers' interview answers and their actions as showing how 'engineered innocence' is maintained through their rhetorical and cultural work. The engineers obfuscate the deliberate nature of the IETF's position of blamelessness when their preferred political and economic order, as shaped through their protocols, is questioned. The cultural work it takes to deny the political nature of the IETF demonstrates that engineering is inherently political, even though the engineers I interviewed might disagree with this statement. It also shows that, contrary to current theorising (Coleman 2004; Green 2019a), technologists are aware of their political power and hence can be asked to act accordingly.

The IETF's separation of politics from protocols harnesses the conservative momentum of its engineering culture, which requires labour to maintain. The specifics of the engineers' unreceptiveness to human rights, as I argue throughout this chapter, can only be understood through their anti-political approach to network engineering. The centralised human rights framework does not map onto the engineers' view of the Internet as layered, distributed, and permissionless. Human rights politics do not align with the IETF's governance structure. In particular, human rights are seen as inviting unwanted State interference in the IETF. Given the negative cultural connotation of statist politics in the IETF, this definition eventually leads the human rights advocacy efforts to be dismissed.

Through documenting these debates about rights and politics, I have shown that the voices representing traditional IETF culture end up defining the content and legitimacy of the human rights work. Many IETF engineers are unwilling to consider how their operating culture or engineering norms should be expanded to encompass controversial values or the social implications of standards. Even people who are willing to broaden their horizons find their efforts

ensnared in the conservative momentum of the organisation's anti-political engineering ethos. The initial energy of the human rights advocates is absorbed in the IETF's procedural mire. The advocates' approach draws from the IETF's engineering procedures, which entangles their goals in the organisation's conservative culture. This dynamic shows why the introduction of novel values in standardisation cannot be accomplished by merely mirroring the IETF's politics, procedures, and work practices. Human rights advocates cannot transcend the IETF's anti-political stance by using its organisational machinery and as such, their efforts provide only a limited accountability check on the IETF's work.

7. Responsibility: The Technology We Choose to Create

7.1 Introduction

The Internet isn't value-neutral, and neither is the IETF. We want the Internet to be useful for communities that share our commitment to openness and fairness. (...) These concepts have little to do with the technology that's possible, and much to do with *the technology that we choose to create*.

(source: RFC 3935, emphasis mine)

In this chapter, I consider how the Internet Engineering Task Force's (IETF) participants choose to create technology. I do so by describing how the explicit commitment to particular values gives shape to sociotechnical imaginaries (Jasanoff 2015) that guide IETF engineers. The IETF's sociotechnical imaginary of protocols provides the cognitive blueprint that guides how designers conceptualise and subsequently code the future Internet. Or as Jasanoff and Kim (2015, 122) argue, imaginaries are 'a key ingredient in making social order' and they have material impacts by exerting power in the design of the Internet's infrastructure. I analyse the political impact of the IETF's imaginaries on human rights advocacy efforts and the IETF's notion of responsibility. I answer the question: How do IETF participants articulate responsibility for the impact of their protocols and politics on society?

Part of the answer to this question is visible in IETF documents like Request for Comments (RFC) 3935, quoted above, which lays out a 'Mission Statement for the IETF'. This 2004 document was created to guide organisational decisions in the case of competing views about standards development. My work illustrates how such views about technology as valuing choice, that circulate in the IETF, underpin engineers' reluctance to assume responsibility for the social consequences of their design decisions. This reluctance is most pronounced when it comes to human rights and social justice concerns; government surveillance and threats to privacy elicit more substantial reflections on responsibility. These different reactions to political questions in the IETF are based on what its engineers care about.

One of the core values of the IETF is that it 'cares for the Internet' (RFC 3844). Engineers see themselves as 'caretakers' of the Internet and their execution of this technical stewardship role draws from the IETF's shared vision of Internet protocols. The engineers' idea of 'taking care of the Internet' is grounded in a 'protocol non-prescriptive' sociotechnical imaginary that informs their technical discussions and engineering practices. This non-prescriptive orientation nudges engineers to minimise existing concerns about how protocol design can fortify societal inequities

or consolidate market power, including those concerns brought forward by human rights advocates. Considering this imaginary enables me to demonstrate how and why certain *choices* make sense to IETF engineers, tracing the roots of their technical design decisions and putting those in the context of recent academic debates about the political ‘co-optation’ (DeNardis and Musiani 2015, 5) of the Internet’s infrastructure. Recognising the centrality of this imaginary explains IETF engineers’ reluctance to explicitly include human rights considerations in their work: it strikes them as excessive and unnecessary.

This chapter offers descriptive depth to when and how engineers are willing to assume responsibility for their technical decisions. In the IETF, engineers’ sense of responsibility for the impact of protocols is tied to the organisation’s guiding imaginaries. The non-prescriptive imaginary of protocols, in particular, leads engineers to place the responsibility for the technology’s potential failure as residing at the Internet’s end points’, i.e., with the companies implementing standards or the individuals relying on them, rather than with their architects. This particular view of technology depoliticises IETF protocols and stymies important debates about the different political agendas instantiated through protocol design. This imaginary also leads engineers to obfuscate the importance of their design decision and the default settings they set, defining the possibilities of the Internet’s use. Much as my interviewees might disagree, every decision in the IETF has political dimensions. By making these political implications explicit, I bring the full array of sociotechnical relationships impacted by the IETF’s work within view.

This chapter proceeds as follows: first, I draw from the earlier introduced IETF design principles to describe the core *Imaginary of Protocols as ‘Non-Prescriptive’* and explain how this imaginary shape design decisions to the exclusion of human rights voices. Subsequently, I introduce the importance of the non-prescriptive imaginary for *the IETF’s Understanding of Internet Caretaking*. I demonstrate that the engineers’ notion of ‘taking care of the Internet’ is narrowly construed as ensuring protocols maximise individual, rather than collective, liberation. Then I consider the balance that the IETF strikes between envisioning harm and their engineering responsibility, which I characterise as *Legitimising the IETF’s Reluctant Sense of Responsibility*. I argue the IETF could strike this balance differently by placing its thumb on the scale of collective empowerment, rather than on the narrow American view of the ideal liberal order where it currently rests. I also discuss some of the flaws inherent to the advocates’ approach to fomenting social change through standards. *Concluding*, I put my findings in the context of the literature on the ‘turn to the infrastructure’ and argue that theories of infrastructural politics

should devote more attention to the role of imaginaries, especially for the ability of these cultural views to affect how the political use of the infrastructure is understood by practitioners and academics alike.

7.2 Unpacking the IETF's Non-Prescriptive Imaginary

In this section, I analyse the IETF's sociotechnical imaginary by surfacing its participants' beliefs about standards. I show that standards represent the engineers' social preferences as much as technical prerequisites; standards reflect not just the technology that is possible, but also the technology that the IETF *chooses to create*. I do so by reintroducing the IETF's design principles, initially analysed in Chapter Five, to exemplify the sociotechnical imaginary that underpins the IETF's understanding of standards. These design principles reflect what I call 'protocol non-prescriptiveness': an imaginary of standards rooted in liberal notions of freedom and autonomy, in which the IETF cannot and should not prescribe how standards are used. I argue that the non-prescriptive imaginary explains the IETF's engineers focus on a limited number of liberal values and their dismissal of the human rights efforts.

The non-prescriptive imaginary is at odds with human rights advocacy efforts because the advocates' approach of connecting human rights to protocols is seen as overly prescriptive and contradictory to the liberal laissez-faire politics that dictate technology development (see Chapter Six). My ethnographic approach maps the cultural imaginary that resulted in the limited uptake of human rights values, showing how this vision can inform ongoing academic discussions. Reframing the IETF's dismissal of human rights values as the result of deliberate human choice—instead of, or beyond a technical incompatibility between human rights and standards—provides a novel perspective on ongoing theoretical debates about the 'turn to infrastructure' in Internet governance. This turn establishes the political use of the Internet's infrastructure as a 'co-optation' of its 'original policy and technical functions' (DeNardis and Musiani 2015, 3). Rather than assuming that Internet infrastructure has a singular original purpose, my work shows that infrastructural functions are constantly developing and contingent on culturally situated imaginaries.

To reveal the imaginary guiding protocols, I draw from the three IETF design principles introduced in Chapter Five: openness, interoperability, and permissionless innovation. Earlier, I

discussed these principles in terms of the arrangements of power contained within their underlying liberal protocol politics. Subsequently, I analysed how that power is expressed in the way IETF engineers enact their anti-political engineering ethos through protocol design, to the exclusion of human rights politics (see Chapter Six). Here, I take those insights to their next logical step by explaining the staying power of these political dynamics, in the face of growing public calls for imaginative change in the technology sector (Benjamin 2019a, 2019b; Paris 2020; Tarnoff 2019; Ten Oever 2020b) and pressure from civil society, through the IETF's guiding imaginary of protocols as non-prescriptive.

Openness

Openness—as the opposite of control—often comes up explicitly as a principle that is constitutive of IETF standards. Many of my interviewees discuss the existence of the Internet as the result of the open and non-proprietary standards developed by the IETF. As mentioned in Chapter Five, openness was seen as desirable in all facets of IETF standards, from their technical constitution to the governance processes through which they were designed. IETF engineers specifically stress the importance of openness as freedom from coercion when they speak about protocols. I often heard individuals state that they did not prescribe how people should use standards. This was seen as good—a sign of openness.

The discussions I witnessed in the IETF about the importance of open protocols reveal the salience of the 'protocol non-prescriptive' imaginary. Openness is often discussed as the ability of nodes to freely connect. This technological freedom is key to understanding why the IETF chose the Internet over alternative competing models, like the Catenet.¹⁰¹ Speaking about the IETF's decision for the Internet model, one engineer pointed out that it came down to openness:

What you don't get in that model [Catenet] is what we get from the Internet model, which is each node in the Internet is part of the same, if you like, overlay. And you get the end-to-end principle of the mechanisms by which any node talks to any other node are the same. The result of that is, when we evaluate that, and say one of them is better than the other, there is a whole bunch of reasons that we could come to that describe them in technical terms but ultimately it comes down to the fact that the end-to-end model is a statement about the ability of two nodes—and therefore the people connected to those nodes—to directly interchange.

¹⁰¹ In a Catenet model, the network of networks is composed in a way where there are firm borders between each network. For further information, see: <https://web.archive.org/web/20201113110518/https://www.rfc-editor.org/ien/ien48.txt>

The IETF could have built a Catenet but *chose* not to. Catenet might have performed similarly, but it would have introduced more points of control than the Internet did. The decision to build one network over another demonstrates a social preference for protocols that are open and non-prescriptive: able to connect without control. This focus on a particular type of Internet also demonstrates how IETF engineers decide to replicate and reify their guiding imaginary through their technical discussions. The seemingly technical nature of debates about Catenet projects the IETF's protocol imaginary of non-prescriptiveness onto discussions about the IETF's responsibility for the impact of protocols.

In practice, I found that this imaginary structurally orients IETF engineers away from explicitly considering the political nature of protocols. For example, one particularly contentious online discussion on the human rights research group's mailinglist about whether the development of RFC 7258 on Pervasive Monitoring (PM)—which denounced the large-scale online surveillance exposed in the Snowden revelations as an attack on the network (I will elaborate on this example below)—reflects the political nature of protocols, arrived at a stalemate. The impasse saw the human rights advocates holding on to their conviction that protocols were political while a majority of engineers argued they were apolitical.

To diffuse the heated tone of the ensuing discussion, one engineer focused on the importance of the open process through which RFC 7258 came into existence. He wrote, 'What's important is that we followed our documented, open consensus process in publishing that statement and that we made sure it was relevant to our work. Some people think that RFC was overreaching; others think it didn't go nearly far enough, so it's probably about right.' The notion of openness as freedom from coercion in design and in social procedures holds such force that the IETF community could invoke it to alleviate political friction between engineers and human rights advocates. Or if not alleviate, at least halt the discussion.

Most human rights advocates remain unconvinced by the argument made about the procedural openness of the discussion as reflecting the IETF's apolitical nature, yet they were unable to resist or reimagine the non-prescriptive imaginary at its basis through their human rights repertoire. Openness—the freedom to connect with minimal control and oversight—encapsulates the non-prescriptive imaginary that serves as an unspoken guiding principle in code and human interaction within the IETF. The IETF's non-prescriptive imaginary of standards fortifies the culture, politics, and values that guide its standards design, such that any attempts to resist these

cultural forces become overwhelming complex as they require a comprehensive reimagination of the IETF's social foundation.

Interoperability

The design principle of interoperability provides another avenue for understanding the IETF's sociotechnical imaginary of protocol non-prescriptiveness and how it complicates the human rights efforts. The need for networks to interoperate and facilitate the exchange of information led to the creation of the IETF (Abbate 2000, 5). Contributing to the discussion on the human rights mailing list, one IETF engineer wrote, 'Indeed, the very point of standardisation is to enable a core minimum of interoperability, and the question is whether or not this core minimum of interoperability should be explicitly designed with a focus on human rights.' In discussions about standards, this clear emphasis on interoperability as guiding for protocols contrasts with the ambivalence around the role of human rights values.

This ambivalence is inseparable from 'protocol non-prescriptiveness'. Interoperability is conceptually anchored in voluntary agreements between network operators to facilitate efficiency and innovation (see Chapter Five). The advocacy efforts, however, rely on a particular understanding of protocols as needing to include human rights considerations. This direction about what protocols should do runs counter to the non-prescriptive notion of protocols held by many IETF engineers. Engineers define interoperability in terms of the voluntary, non-contractual nature of standards. One engineer explained on the human rights mailing list:

We write them [standards] not because they have some sort of "standing", but because we need conventions. Getting the benefit of the Internet relies on interoperation without explicit agreements among the various parties. RFCs are, basically, advice for interoperation. "If you do it this way, then you'll interoperate. If you don't, you might not." The IETF is notable for its total lack of a protocol police force, and that's because we're not writing law. We're writing guides for how to interoperate. It's still your network; you can make your own rules if you want. You just won't get the benefits of interoperation.

This view of the Internet as a set of independent networks tied together by the shared benefits gained from interoperation is extremely common in the IETF. Engineers imagine interoperation as a matter of continuous and active choice. Trying to 'police' how different individuals run their network, by creating overarching rules or principles, would undermine this principle.

IETF engineers see the efforts of the advocates and their human rights considerations as a threat to this ideal of unforced interoperability. In the words of one engineer, ‘All that [standards] needs to be consistent and predictable, you cannot create a suite of human rights considerations for protocols, then a completely different suite for whatever because they need to be interoperable. Everything on the Internet needs to be interoperable to make sense.’ IETF engineers perceive the human rights advocates as prescribing not just how to develop standards, but also how and when to interoperate. Instead of focusing on mutual benefit, engineers feel the advocates try to force a foreign view of technology, at odds with how the Internet works. A similar dynamic arises when discussing permissionless innovation.

Permissionless Innovation

Permissionless innovation is the ability of any individual to connect or innovate, for example by linking networks or building applications and services that run on top of existing networks, without needing approval from a central authority. The absence of a single source of authority is integral to how IETF engineers understand standards (see Chapter Five). In my interviews, they present standards as the results of individual choices to develop and implement protocols. Refusing to take up an authoritative position is a strength, with one engineer noting that, ‘The good thing is that the IETF is not the “protocol police” because the Internet is permissionless, people can design the protocol and implement and deploy it without the authorisation of the IETF.’ Many of my interviewees see standards as the result of volunteer engineers coming together and growing the network, without that work being mandated, guided or curtailed by a central authority. Or in other words, as coming together without being prescribed to do so.

If the IETF were to start behaving authoritatively and enforcing human rights, engineers reason, it would undermine the various design principles that made the Internet successful. Many IETF engineers resist human rights advocacy efforts because they believe such advocacy would assign the IETF the role of a centralised authority, analogous to the international body of human rights and the legal entities tasked with enforcing it (i.e., States and intergovernmental organisations). This proposed reorientation threatens the engineers’ tacit assumptions about the nature of standards, as well as what I introduce as their view on the overarching purpose of the Internet: unspecified growth through permissionless innovation (see Chapter Two and Chapter Five).

When engineers were asked to consider an external source of authority (human rights) in their work, as I explained in Chapter Six, the advocates were cast as a threat to the permissionless part

of innovation. In discussions about permissionless innovation, many IETF engineers stress that standards are rooted in voluntary agreements to exchange data across diverse networks. This voluntarism is key. As one engineer wrote, ‘By definition, the Internet is a network of networks etc. Each participating network makes its own rules, including the rules about how to interconnect.’ This statement reflects a general sense amongst IETF engineers that standards cannot be mandatory. This non-prescriptive understanding of standards surfaces repeatedly in my interviews. In this understanding, protocols work because different stakeholders see a mutual benefit in cooperating and *choose* to connect, without being overseen or managed by a central authority.

Openness, interoperability, and permissionless innovation are technical achievements just as they reflect a culturally specific view of what standards are or should be. Central to the imaginary that ties these principles together is the cultural imperative of non-prescriptiveness. These tacit and normative understandings of standards illuminate how IETF engineers’ sociotechnical imaginary is bound by a commitment to protocol non-prescriptiveness—the idea that standards are voluntary and that the IETF should not prescribe how its technologies are used. It is easy to dismiss these imaginaries as ephemeral, especially as some of the IETF’s guiding design principles, like openness and permissionless innovation, increasingly do not map onto the Internet that is heading in a more closed and proprietary direction (Arkko 2020; Zittrain 2008). However, how these principles, and their underlying imaginaries, mediate human rights values speak volumes to their continued directive force in standardisation.

Non-Prescriptiveness and the ‘Turn to the Infrastructure’

My findings of the direct connection between the sociotechnical imaginary of non-prescriptive protocols and the design of the Internet’s infrastructure provide novel insights for the recent ‘turn to the infrastructure’ in Internet governance research (DeNardis 2012; DeNardis and Musiani 2015; Musiani et al. 2015). In Chapter Three, I introduce this turn as focused on the political use of the Internet through a theory that perceives such political use as ‘co-optation of the Internet’s infrastructure’ (DeNardis and Musiani 2015, 3). To distinguish infrastructure co-optation from its regular use DeNardis and Musiani (2015) define some of the infrastructure’s technical and policy functions as ‘original’ and analytically separate those from recent or novel uses.

I apply my findings, about the role of imaginaries in shaping the political use of the infrastructure, to unsettle the philosophical underpinning of Musiani et. al's (2015) theoretical framework, which implies that the 'original' technical and policy functions of the infrastructure were predeterminable and stable. Rather than situated within their specific socio-economic context and shaped by historic cultural forces, as I argued throughout this dissertation. Disconnecting the 'original technical and policy functions' of Internet infrastructure, and labelling some uses as co-optation, contains a deterministic understanding of technology. My work on the IETF shows that such bracketing off of the 'primary technical and policy functions' of Internet infrastructure is itself a movement that depends on culturally contingent and socially situated imaginaries.

This means that human rights advocacy, and other public interest efforts, within the IETF are not necessarily outside of its technical and policy functions. I argue that the developing and changing nature of the political use of infrastructure reflects a rearrangement in its 'hierarchy of functions' (Larkin 2013, 336) rather than infrastructure co-optation. This anthropological approach to the changing nature of the Internet's infrastructure rejects the dominance of deterministic 'original function' by focusing on the ever-evolving nature of the socio-technical relations that are needed for the infrastructure to exist. As such, I provide a more contextually embedded view in which political uses of the infrastructure are seen as novel iterations of an established IETF practice: the structural inclusion of social and political questions in standard development, but in a form that critically pushes on the organisation's politics and visions for the future Internet.

7.3 Internet Caretaking: Non-prescriptiveness in practice

Non-prescriptiveness as an imaginary shapes IETF politics by cementing the engineers' affinity for liberal values and conservatism. In this section, I examine the consequences of the non-prescriptive ideal for the IETF's notion of responsibility. Unpacking the IETF's imaginary of non-prescriptiveness is an important step in untangling how sociotechnical imaginaries, especially around responsibility, make their way into the Internet's design. My observations can act as the preamble to the policy shifts that will be needed to accommodate the future Internet. Such policy changes will ultimately depend on an in-depth understanding of the cultural visions that drive the

material practices of Internet architects, and their willingness to take on responsibility for the consequences of their actions.

One of the first questions I asked in my interviews was why my participants wanted to work within the IETF (see Appendix III). Most answered that it was their personal interest in networking that initially led them to the organisation, while their dedication to ‘take care of the Internet’ kept them engaged. For some IETF participants, such custodianship is defined along a narrow set of technical properties: making sure the Internet was fast, reliable and secure. For others, it is building an Internet that would generate particular social and political relations. For example, some discuss the IETF’s active resistance against building surveillance capabilities into the network at the behest of governments. Others still want to prevent corporate networks from having any switches that would allow them to turn off the encryption functionality on protocols.

Each of these answers reveals various components of the visions that fuel IETF engineers, in which the Internet is seen as a positive force for good (see Chapter Five). However, these answers also demonstrate that the IETF’s protocol non-prescriptive imaginary is neither altruistic nor utopian, solely aimed at the betterment of humankind. Rather, these discussions demonstrate that the engineers’ ambition for a better society emerges from the same narrow conceptions of ‘caretaking’ as contained within the IETF’s protocol politics: a society that maximises individual freedom, even if it comes at the expense of collective concerns. While views of what technology is are always contextual, in the next paragraphs I introduce two recent IETF discussions that highlight how the political consequences of non-prescriptiveness, in particular around the adjudication of blame for technology failing and the invitation of oversight, hinder the IETF’s self-described role as the Internet’s caretaker.

The End-User of Protocols is to Blame

The non-prescriptive imaginary guides how IETF participants speak about the end-users of protocols.¹⁰² I illustrate that the ‘prodigal end-user’, as some of my interviewees jokingly called this idealised user of protocols, draws from the non-prescriptive imaginary by taking on a deeply liberal shape. This imaginary reflects the IETF’s protocol politics rooted in the engineers’ preferences for voluntarism, individualism, civil liberties, and laissez-faire technology development. The end-users, as IETF engineers imagine them, value freedom of choice and want to have the option of adjusting default settings on their systems. These end-users also want freedom from unwarranted government surveillance and expect protocols to work for them rather than for the State.

This view of end-users as free and technically empowered has a flipside: IETF engineers also hold these end-users responsible for the fallibility of technology. If a protocol affects society adversely, that is the fault of its users rather than its designers. This view of the end-user as culpable depoliticises the design decisions made by the IETF because it locates politics with the Internet’s users rather than with the architects enabling and anticipating Internet use.

Where end-users have not specifically articulated what they want from the Internet, IETF engineers assume that their liberal protocol politics will best meet users’ technical needs and requirements. When discussing different technical options for a protocol, for example, it is not uncommon to hear IETF engineers refer to their mothers or grandmothers, describing the women in their lives as not technically savvy and unlikely to be able to articulate preferences or desires on a technical level. Mothers’ and grandmothers’ imagined lack of knowledge becomes an argument in favour of IETF engineers imagining their needs and making *choices* about technical designs accordingly. In practice, the needs IETF engineers ascribe to their (grand)mothers never contradict the IETF’s liberal politics. What is good for the end-user mirrors what IETF engineers believe is good politics in general.

When discussing what is good for end-users, my participants also routinely emphasise protocols’ voluntary nature: even though the IETF designs protocols, protocol users do not have to follow the specifications set out by the organisation and can change the default settings. I touched on this issue when I showed how IETF engineers dismiss advocates’ concerns regarding the impact

¹⁰² This group of protocol users includes individual consumers of the Internet but in the context of the IETF primarily refers to the various companies (like browser developers, hardware manufacturers, telecommunications providers, and network operators) that use IETF protocols to ensure their products are interoperable.

of protocols on human rights (see Chapter Six). Referring to human rights, my participants argue that even if the IETF took every possible precaution, protocol implementers and users could still opt to ignore their instructions. As one interviewee put it:

Even if we perfectly do our job and make a nice human rights preserving protocol it won't be over. There will be many issues of deployment, marketing problems, but at least we should clearly separate what is our responsibility as IETF participants and what is a more general social responsibility, the one of every citizen.

This means that general social responsibility always happens voluntarily, when individual citizens take it up, and the IETF should not infringe on this terrain. The engineers I spoke with emphasised that 'the IETF is not the protocol police', meaning they could not, and should not, mandate how protocols were used. This connection between the IETF's voluntarist politics and their non-prescriptive imaginary both empower and ultimately make the end-user responsible and comes up repeatedly in my interviews. One engineer told me:

There is a common confusion about standard-setting. It is seen as a legislator, or that because something is specified or mandated, that it just happens. However, standard making, when it is done well, shows a lot of humility about the limitation of what can be done in standards, given that they are very commonly not implemented well, or not implemented the ways we thought. That also means that sometimes, even if they are implemented, even if you get a strong requirement in because there is not a requirement to follow it, there is very little force behind standards.

Because the IETF cannot and should not enforce how protocols are used, it can remain humble about its limits: the real responsibility, in this narrative, always lies with end-users. However, this dismissal of the responsibility by projecting the non-prescriptive imaginary onto end-users starts to fray when considering the commercial dimensions of standardisation.

IETF engineers regularly invoke the end-user to deflect responsibility for the consequences of their design choices and often do so to obscure underlying commercial incentives for particular design decisions. Discussing recent debates about Domain Name System (DNS) encryption protocols—which ensure DNS queries remain private (see Chapter Five)—one of my interviewees explained, 'With DNS over Hypertext Transport Secure (DoH) you kind of see the commercial incentives for Mozilla and Cloudflare under the premise that it increases privacy and is good for the user. But this solution also consolidates the market, is one of the arguments against this.' The same DNS encryption protocols that IETF engineers consider good for the end-users' privacy also benefit the commercial goals of Internet infrastructure companies seeking to embiggen their

market share. This latter dimension, however, often remains unspoken or is explained as an inevitable side-effect of the choice to focus on end-user agency.

IETF discussions about DNS encryption present this work as neutral, or as divorced from the various political, cultural, and economic forces that drive standardisation. Yet, my analysis shows that when balancing the various potential needs or desires of end-users—in the case of DNS encryption, their need for agency versus the negative impacts of Internet sector consolidation—the IETF makes a clear choice. The IETF's view of the end-user thus is not a neutral one. Rather, how the organisation applies non-prescriptiveness to this technical debate clearly reflects the organisation's politics and commercial drivers. One senior engineer confirmed this dynamic to me when I pressured him on it, noting that, 'When we are saying "the users" we are using that as a shorthand, (...) where we are sliding right across the policy discussion, we are sliding right over the boundary of whose values are served by focusing on the end-user'. In spite of this 'sliding over', the IETF's technical discussions always touch on, and often purposely rearrange, the social relationships arising out of technical designs. Speaking of 'the end-user' and the non-prescriptive nature of protocols allows IETF engineers to offload highly political decisions about what is good, in technical or commercial terms, to other people. Assessments about which concerns are, or are not, urgent guide standardisation at the IETF, but the movement from architect to user allows the political trade-offs IETF engineers face to disappear from view.

The view of the end-user that emerges from these conversations is fundamentally paradoxical. On the one hand, the IETF assumes a paternalistic perspective, presuming and predicting what end-users care about based on the organisation's cultural values. On the other hand, the IETF empowers end-users to change protocols themselves, so that they can also be held responsible for their societal impact. The contradiction demonstrates the power that the IETF has to set the standard as its architects define the factory options for protocols, while simultaneously denying their part in the consequences of these choices that, as I showed in Chapter Five and Six, can directly impact social order beyond the IETF's remit. The IETF's non-prescriptive imaginary is projected through its protocol politics into the material design of the Internet. The details of this process, as I demonstrated there, are defining for the IETF's willingness to assume responsibility for the political consequences of its technical decisions.

Seemingly technical discussions about what is good for end-users have systemic social effects on the shape of the Internet's infrastructure. In the words of one senior engineer, 'as it turns out,

what is good for the network, is good for a certain kind of user'. For the IETF, technical discussions about the future Internet are always framed by the engineers' preference for individual liberty, market-based development, and limited State interference. As Mathew argues, 'technical communities produce themselves as actors able to act for the good of the Internet, in relation to political and economic interests' (2014, 226). Designing for the end-user is difficult to distinguish from designing in the interest of the (corporate) self. In the next section, I examine some of these interests in more detail, bringing into focus how the IETF's sociotechnical imaginary present a well-engineered Internet as a positive force in society while allowing engineers and their employers to carry minimal responsibility for its impacts.

Oversight is Unnecessary

The role of non-prescriptiveness in the IETF's deflection of responsibility is also visible in how it shapes discussions about external intervention into, and oversight of, the IETF. Imaginaries matter to Internet engineering in the way they structure discussions about the locus of responsibility and for how they facilitate, or complicate, external oversight over the IETF's functioning. In this section, I demonstrate how the sociotechnical imaginary of non-prescriptiveness leads the IETF to take up political positions that reject state intervention in, and civil society oversight of, their work. I do so by introducing the effects of the Snowden revelations for technical discussions in the IETF. I analyse the engineers' dismissal of the human rights efforts to later show the non-prescriptive imaginary foments a sense of 'reluctant responsibility'—which sees the engineers hesitantly taking on only a limited number of concerns inherent to their obligation as Internet caretakers.

In 2013, Snowden—a former contractor with United States intelligence agencies—leaked a trove of documents revealing detailed information about government surveillance programmes and the complicity of telecommunication companies. The Snowden revelations shocked the IETF. They were, in the words of one of my interviewees, 'A big jolt to the system. A lot of people, especially those who were here from the beginning pushed to prevent this from happening again in the future, we are going to encrypt everything. No more wiretaps or things like that.' His strong reaction is interesting to note since IETF engineers generally describe themselves as hesitant to prescribe how individuals should connect their systems or use networked information. Before these revelations, IETF engineers considered their existing security practices good enough, 'barring maybe some crazy scenario where an entire government was going to dedicate millions

of dollars to crack it', as one engineer quipped. Snowden revealed that governments had these resources as well as geopolitical interest in their application, which for my interviewees meant that their existing security threat models were insufficiently attuned to the dangers that States posed to the Internet's functioning.

All of my interviewees conceded that they were aware of United States 'wiretaps' on the network prior to the Snowden revelations. Still, their indiscriminate use and impact on individual liberties jolted the IETF to respond. This response came in the shape of an RFC, the IETF's formal documentation system. RFC 7258, 'Pervasive Monitoring is an Attack' was a direct response to the Snowden revelations. In it, the IETF community agreed that the Pervasive Monitoring (PM) revealed by Snowden was an attack on the network. In particular, they express their concern about how monitoring undermines privacy: 'The IETF community's technical assessment is that PM is an attack on the privacy of Internet users and organisations. The IETF community has expressed strong agreement that PM is an attack that needs to be mitigated where possible, via the design of protocols that make PM significantly more expensive or infeasible.'¹⁰³ The IETF's technical answer to the Snowden revelations reflects the organisation's commitment to protecting the Internet from government overreach.

At the same time, the Snowden revelations did little to change the engineers' generally positive outlook on the Internet (see Chapter Five) or their view of protocols as needing to be voluntary in nature. When I asked participants if the revelations led them to revisit their view on the role the IETF should play in pushing back on State use of the network for surveillance purposes, most responded that 'no, it did not'. This was the case both for those in favour of and those against cooperation with governments. This staunch techno-optimistic outlook results from the underlying imaginary of protocols shared by IETF engineers, which consistently presents the protocols as a force for good through their voluntary nature and uptake by powerful Internet companies. IETF engineers, I found, are able to maintain this non-prescriptive view, even in the face of concrete evidence of governments using the Internet to constrain individual liberty, by defining the Internet as a neutral infrastructure that had been abused, justifying intervention in this particular case.

¹⁰³ RFC 7258. Pervasive Monitoring is an Attack. Stephen Farrell and Hannes Tschofenig. <https://tools.ietf.org/html/rfc7258>. May 2014.

The IETF's limited interest in taking on a custodial role for societal values becomes particularly visible in their deflection of human rights questions. The IETF's non-prescriptive imaginary of protocols has direct political consequences for the human rights efforts. I analyse this imaginary to explain the limited impact of the advocates' efforts across the seven-year span of their participation in the IETF. Throughout this dissertation, I argued that the human rights advocates tried to adapt to the IETF's cultural practices and norms. For example, the human rights advocates closely follow the technical requirements for running an Internet Research Task Force (IRTF) group and publishing their human rights guidelines in the RFC format (see Chapter Six).

However, these efforts are to little avail. Even though the advocates did not call for changes that would fundamentally hamper permissionless development of the Internet, many engineers worry that introducing human rights into standards design would undermine the IETF's voluntaristic approach to internetworking. They see the voluntary nature of standards as fundamental to the Internet's continued functioning; requiring people to include human rights considerations would run counter to the prevailing non-prescriptive approach. Engineers are cautious about taking on a more prescriptive position in how standardisation should occur, and they reject the advocates' call for including human rights considerations in standards development. The IETF is especially worried about whether the human rights interventions would invite explicit government scrutiny or oversight, which especially against the break of trust between State actors and the IETF after the Snowden revelations, is seen as a threat to non-prescriptiveness.

Flaws in the Human Rights Advocates' Approach

The advocates' imaginative work about the relationship between protocols and human rights directly challenges protocol non-prescriptiveness. Human rights advocates believe that standards need to serve humans and should be geared towards the social goal of respecting their rights (see Chapter Five). One IETF engineer explained what this meant for the role of human right advocacy in the organisation, "The problem is that it will be seen as didactic by the community that it is meant to influence. And far from achieving what it wants, there is a risk that it could back-fire. It gives ammunition to the enemies of the [human rights] group'. These tensions remain unresolved, but they help explain why, at the time of writing, the human rights RFC sees limited uptake and the human rights advocates have been unable to publish further documents.

IETF engineers' dismissal of the human rights work results from their belief that the approach of human rights advocates would require a shift in the IETF's view of protocols as non-

prescriptiveness. The majority of IETF engineers are unwilling to imagine such shifts, for fear of how it would affect the Internet's overall technical functioning and the economic and cultural imperatives that undergird it. Behind the role of overpowerful engineers, is the IETF's far less tangible imaginary of protocol non-prescriptiveness—of the Internet as a neutral force for good, of the end-user as responsible for protocol impacts, and of the State and human rights oversight as the enemy—that stands in the way of the organisation taking on a broadly construed Internet caretaker role that considers questions of rights and justice.

Yet, the inability of the advocates to successfully challenge the imaginary of protocol prescriptiveness was not the only barrier to their efficacy. Their limited success also stems from various flaws in the advocates' approach and theory of change. In Chapter Six, I outlined how the advocates' decision to mimic the IETF's, rather than follow the IRTF's, strict procedures for publishing an RFC tied their work into the engineers' anti-political engineering ethos. Doing so, complicated the advocates' ability to foment the cultural changes necessary to introduce new values into protocol design. Further hampering their work is the advocates' theory of change, which I argue is rooted in tech-essentialism (Cohen 2019, 4; Myers-West 2021, 9). This particular approach situates power and political change in technology rather than in human action. In particular, the advocates' approach assumes there is a direct connection between protocol design and upholding human rights, such that 'human rights aware' design of protocols could directly protect human rights values online.

The advocates' particular vision of the relationship between technology and society contains an overly optimistic appraisal of the ability of technology to foment societal change. This philosophy is in many ways incongruent with the advocates' claim that protocols are political, which requires locating the importance of human decision making in technology development. Focusing civil society efforts primarily towards technology inevitably fails to induce change because it means the advocates reaffirm the importance of technical skills for fomenting societal transformation. These efforts risk overlooking how the outcomes of technology are contingent on social, economic and political conditions. Changing protocols such that their human rights eroding properties are addressed requires fundamental changes to the larger ecosystem of their use.

Likewise, the core assumptions of the human rights work, which I outlined in Chapter Three as mistakenly assuming there was a natural overlap between the values guiding human rights frameworks and those informing engineering, hampered the advocates' work. One human rights advocate reiterated this assumption in our interview, three years after the start of the human rights

work, as follows, ‘It [the human rights approach] takes the IETF as it is and it maps its values and approach to governance onto a sort of human rights framework and that is why this approach was so compelling because it showed that this is a great place for engagement because there already is so much shared value.’ Throughout this chapter, I showed how the IETF’s values and imaginaries make its engineers anything but receptive to human rights values.

The incompatibility between human rights and engineering values suggests there is an urgent need for the advocates to reevaluate their approach and the grounding assumptions of their theory of change, to overcome the cultural hurdles posed by the engineering cultures. Regardless of whether such future protocol-based engagement with rights and equity concerns would be good for the Internet, the IETF’s visions of what is ‘good’ of the Internet, and to a lesser extent the advocates’ current approach, actively prevent such engagement. This conclusion offers a new vantage point for considering the IETF’s rejection of responsibility for the ‘social order’ instantiated through their design decisions. In the next section, I explain how the IETF’s non-prescriptive imaginary forms a collective sense of ‘reluctant responsibility’, captured in the engineers’ hesitancy to consider the role of politics in protocol development and their disinclination to consider the effects of their decisions for human rights.

7.4 Legitimising Engineers’ Reluctant Responsibility

The sociotechnical imaginary of non-prescriptiveness represents the extent of the political responsibilities the IETF is willing to assume. Not offering a systematic response to human rights and justice concerns becomes another way to be non-prescriptive, with engineers intervening only when what they consider ‘good’ about the Internet—commercial incentives or liberal values—are at stake. In the latter case, only the most blatant government abuses of mass surveillance powers can jostle the IETF into assuming responsibility. The IETF’s role in furthering human rights erosion, market consolidation in the Internet sector, or racial and gendered disparities limiting access to organisation’s governance processes, are routinely dismissed as beyond its mandate. The refusal of responsibility for these political consequences is as much a choice as is engineers’ decision to build encryption protocols tilted toward privacy and against government interests. Yet, the IETF instead casts such engagement with rights as the natural outcome of a commitment to non-prescriptiveness.

The pervasiveness of this non-prescriptive imaginary is that it encourages engineers to disavow their roles within the larger set of sociotechnical relations arising out of protocols. Non-prescriptiveness, in this sense, resembles the ‘objectivist stance’ described by Suchman, which ‘by losing track of the social mediations of technical production, supports the impossibility of specifically locating responsibility for it’ (2002, 5). Except in the case of the IETF, the engineers’ dismissal of this responsibility is not the result of a distracted or naïve sensibility towards the impact of their decisions. Rather, it is the ‘engineered innocence’—a sense of purposeful naiveté when the political and economic social orders shaped through protocols (and the benefits IETF engineers derive from them) become threatened—I outlined in Chapter Six, put to practice. IETF engineers purposefully draw from this position of innocence to define their work as ‘just technical stuff’ and doing so makes it possible for them to see anything that occurs beyond the IETF as unrelated to their work. Focusing on the non-mandatory nature of protocols enables engineers to depoliticise these artefacts and their role in designing them, they draw from this imaginary to justify their “innocence”.

Non-prescriptiveness hampers important discussions about whose politics are coded in protocols to which ends because it allows engineers to avoid reckoning with the position they take up. The IETF’s reluctance to act on the concerns raised by the human rights advocates and its strong response to the Snowden revelations are but two examples of its direct power to shape these infrastructural systems. These two debates show how IETF standards contain a particular cultural understanding of a desirable social order (Jasanoff 2015, 25): one in which standardisation can guarantee protection from government surveillance, while it cannot address other social concerns, including those related to human rights. Arguing that the IETF bears no responsibility for the social consequences of its design decisions is akin to arguing that these decisions are futile. Yet, I showed that design decisions around connectivity and permissionless innovation are important precisely because protocols have social ramifications.

Decisions about standards prefigure what kind of world and futures can be built with technologies that allow for global connectivity and individual creativity. IETF engineers built the Internet with a particular social world in mind: optimised for the pursuit of individual liberty, with minimal oversight and no centralised control. In doing so, their work advances the known flaws of the design philosophies guiding the Internet’s early (see Chapter Three) and current (see Chapter Six) development. The original architects’ dreams of building universal access and efficiency through Internet infrastructure has not materialised today because sociotechnical inequality is

not solvable through their founding ethos of unspecified openness and network growth alone. This deeply American view of the perfect social order and its associated sociotechnical imaginaries are a poor fit for the modern-day Internet. New imaginaries for IETF protocols are needed, ones in which its engineers render the social world they strive for, when they design the Internet, more permeable to human rights and justice concerns.

When engineers define their responsibility for the political consequences of protocols they are—by and large—reluctant to answer the calls of human rights advocates to consider the potential impact of their design decisions. When ‘left to their own devices’, as one of my interviewees said, engineers are likely to dismiss social ramifications as ‘someone else’s problem’. These self-imposed restrictions on standards’ domain of relevance are partly the result of practical limits. As one engineer said, ‘people don’t know how to think about the social problems’ and so they bracket those for someone else to solve. This approach seems more modest than the ‘technochauvinism’ (Broussard 2018) that is endemic in social media companies, whose designers mistakenly state that their technology is the right solution for a myriad of social problems. Yet, when IETF engineers bracket the social aspects of their work this is explicitly a choice to obfuscate power and deny responsibility.

The IETF’s deflection of responsibility reflects a fear of the scale of such responsibility. One interviewee justifies this fear by referring to the pervasiveness of IETF protocols, ‘The Internet is extraordinarily powerful and a big part of people’s lives. And the small things we do here, sometimes they might seem futile but the small things we do here can have a big impact on how things work.’ Because the social consequences they could be responsible for are almost limitless, accountability becomes a scary prospect. One engineer told me, ‘The problem is that the IETF has a really large responsibility. The Internet depends on the work here. In that sense, the IETF *is conservative* and that also causes pushback for new ideas.’ Human rights, as I argued in the previous chapter, are a particularly worrisome new idea to IETF engineers. The legal framework of human rights could undermine the IETF’s carefully crafted framework for avoiding liability lawsuits, making it subject to a novel—and potentially overwhelming—set of legal and moral responsibilities.

Because the IETF has deflected responsibility for such political issues, however, these conversations about their responsibility never push beyond the engineers’ existing imaginaries and politics. According to the IETF, only some political developments merit an explicitly technical intervention. Material support or design practices aimed at addressing the rights-

eroding effects of standards remain out of scope for the IETF. When engineers do act on concerns raised by human rights advocates, their responses are often ad hoc rather than structural. While it is true that the IETF has limited ability to mandate how protocols are used, its decisions to include or exclude features in protocols do enable or inhibit particular functions of the Internet. The engineers' reluctance to take responsibility for the evident social implications of standards' design at the IETF is discordant with the importance of these social effects in steering ongoing IETF conversations. I detailed how some of the liveliest debates in the IETF concern the social implications of technical decisions, whether about encryption, surveillance or human rights.

On the one hand, the IETF's reluctance to design toward explicit values, like the safeguarding of human rights, is sensible. As an elite, technocratic and relatively unaccountable gathering of mostly corporate engineers, the organisation is ill-positioned to make decisions that affect the daily lives of billions of individuals, whether it comes to privacy, access to information, or other human rights. But the fact remains that this is precisely what their work entails, whether they acknowledge it or not. IETF engineers are making social decisions every day; sidestepping responsibility for adverse impacts that stretch beyond commercial incentives or the limited liberal politics to which they profess fealty, does not change that. The result of the IETF's refusal of responsibility is an engineering community that I define as 'reluctantly responsible', in that its engineers provide a minimal check on a limited number of harms.

It does not have to be this way: there is a different balance that the IETF could strike in envisioning harm reduction and engineering responsibility. On some level, its engineers realise this, as one told me: 'I wonder whether we have the right expertise to do human rights work, but by the same token—we can't ignore the role that we do have.' If the IETF were to adopt a wider view of the role of their technology in sociotechnical systems, engineers would be able to recognise—and perhaps question—their own active choices in a much wider range of decisions. Doing so, however, requires an update to the IETF's understanding of the Internet and the deeply American view of the ideal social order that guides protocol development. Rather than viewing the Internet as an inherent good best guided by a group of 'hands-off' technical caretakers, the engineers should consider how their non-prescriptive approach is the very impediment to the liberation they hope to foment through Internet infrastructure. Such freedom is simply unattainable by following flat design principles of undirected growth and political values

prefaced on individual empowerment, as they do not attend to the underlying sociotechnical dynamics that define liberation.

Reluctant Responsibility and the 'Turn to the Infrastructure'

My ethnographic description of the role of the non-prescriptive imaginary in defining what technical and social demands IETF engineers put upon the network have implications for the 'infrastructural turn' (DeNardis 2012; DeNardis and Musiani 2015; Musiani et al. 2015) in Internet governance. I situate these findings in the literature and reflect on human rights advocacy as a co-optation of the Internet's infrastructure. My findings complicate the philosophical foundation of this theoretical turn, which holds that it is possible to isolate the infrastructure's 'original technical and policy functions' (DeNardis and Musiani 2015, 3) from their current political use, or 'co-optation' as the turn's authors' call it. Forcing a deterministic theoretical divide, between original and contemporary functions of infrastructure or between its common political use and co-optation, becomes hard to maintain when considering the practice of Internet standardisation from the ground up. I argue that the functions of the infrastructure are dependent on, the visions, politics and aspirations of what it means to 'take care' of the Internet as held by its architects, as well as the changing commercial and political demands exerted by society.

These visions for the proper future of the network underpin engineers' tendency to default to maximising liberty for individuals, and their networks, while maintaining market-driven standardisation. The non-prescriptive imaginary contains and reifies the IETF's protocol politics, which depend on traditional liberal ideals of individualism, freedom from government interference, and laissez-faire technological and economic development. In answering the research question of this chapter, how do IETF participants articulate responsibility for the impact of their protocols and politics on society, it becomes clear that the IETF's reluctance to assume responsibility is not rooted in the absence of politics in IETF standardisation. As engineers debate technical choices by referring to what is good for the Internet, they reveal the political nature of the IETF's work. The engineers' hesitancy to consider politics more substantially stems from a lack of truly progressive and emancipatory visions for the development of the Internet, a standstill that is likely exacerbated by the IETF's corporate and homogenous participant base.

7.5 Conclusion

My work adds new insights by focusing on the cultural dimension of protocol development, in particular, its effects for the kind of responsibility frameworks engineers can imagine. I have argued that the non-prescriptiveness of technology is an unstable starting point for debates about engineers' responsibility for the political impacts of their designs. The inconsistency with which IETF engineers intervene in political debates makes this abundantly clear. Unusually responsive to privacy concerns, engineers are frank about their role in protecting Internet users from government overreach. They even explicitly argue that they will not build surveillance capabilities for private networks either. However, when it comes to reducing human rights harms other than those affecting the privacy of individuals, engineers routinely argue that they have neither the mandate nor the obligation to intervene, and that there is no requirement for them respond to the concerns of civil society advocates consistently.

I have demonstrated that the sociotechnical imaginary of protocols orient engineering practices and design in the IETF away from considering politics beyond those already valued within the organisation. When they speak about standards, IETF engineers highlight openness, interoperability, and permissionless innovation. Their articulation of these technical functions of the Internet's infrastructure reflects these function's roots in liberal notions of individual freedom, voluntarist connection, and choice. That is, the engineers understand standards through their overarching imaginary of non-prescriptiveness: a vision for the Internet in which there is no authoritative oversight that puts boundaries around the network's growth or development. The normative force of this imaginary guides both the preferred politics and design principles in the IETF, directly transposing engineering values into Internet infrastructure.

Accepting the IETF's sociotechnical imaginaries as what is 'good for the Internet' means validating a system of diffuse and distributed responsibility in which democratic influence over the material engineering practices that construct the Internet looks increasingly impossible. Yet, pushing back on this non-prescriptive narrative or formulating alternatives for it, as some advocates attempted to do, proves exceedingly difficult. In part because of the flaws inherent to the advocates' specific tech-essentialist approach to fomenting societal change through standards. Yet mainly, because the IETF's cultural imperative that standards remain non-prescriptive increased tensions between the human rights advocates and IETF engineers. IETF engineers see the human rights advocates' aims and goals as imposing requirements on standardisation in ways

that would contravene their culturally specific view of non-prescriptive standards as desirable and essential.

Concluding, I have argued that IETF imaginaries allow engineers to justify the organisation's supposed technocratic governance structures, an insight my work builds on to call for the repoliticisation of protocols and new imaginaries to guide the development of the Internet's infrastructure. Studies of the politics of infrastructure should reorient to consider the directive power of cultural imaginaries, specifically their ability to render particular uses of the infrastructure sacrosanct or sacrilegious. My analysis makes both the political impacts of protocols and technologists' reluctance to assume responsibility for these consequences visible as the result of active cultural choices.

8. Conclusion: Setting the Standard for Infrastructural Politics

8.1 Introduction

The willingness of opaque Internet infrastructure organisations to act on their responsibility as political actors vis-à-vis the public good will remain one of the defining debates about the Internet, in academia and in politics. Infrastructure organisations, including the Internet Engineering Task Force (IETF), ‘set the standard’ for our collective experience of the Internet through the politics their engineers enact through its infrastructure. When weighing infrastructural decisions, these often-invisible actors draw from shared cultural beliefs and practices that shape which values the Internet engenders, what practices protocols encourage, and which people feel empowered to use the network or participate in its governance. The political preferences of engineers and the technical interventions guiding debates about human rights, in turn, highlight the extent to which the Internet’s opaque politics emerge from the culture IETF engineers share.

Policy concerning Internet infrastructure politics tends to focus on companies in the content business: social media companies, online retailers, and so on. But these companies would not function without the support of lower-layer infrastructure. The final years of my dissertation research saw Internet infrastructure actors assert themselves in the public debate with renewed vigour. Various Internet companies that provide infrastructural services like web hosting and security protection to social media and other content-hosting companies made high-profile decisions that brought them into view as content moderators, political decision-makers, and gatekeepers to the Internet.¹⁰⁴ My ethnographic work at the IETF allowed me to examine how the architects and engineers of the Internet, as well as the human rights advocates working alongside them, negotiated these roles.

My focus on political decision-making in Internet infrastructure refuses companies’ self-presentation as ‘mere conduits for content’.¹⁰⁵ This dissertation troubles that claim, demonstrating that infrastructure actors play a crucial role in defining the settings of the future Internet. The renewed public visibility of infrastructure actors lends new urgency to the main research question

¹⁰⁴ In the introduction chapter of this dissertation, I mention a number of recent examples including cybersecurity company Cloudflare cutting their services to a messaging board after it was used to propagate hate in the wake of a mass shooting and cloud infrastructure provider and online retailer Amazon cutting its infrastructural support to a social media company used by right-wing agitators to coordinate and justify the storming of the United States Capitol in January 2021.

¹⁰⁵ See, for instance, this blog by the CEO of Cloudflare, which ended its services to a message board used by the perpetrator of a mass shooting in the US in 2019: <https://web.archive.org/web/20210316053518/https://blog.cloudflare.com/terminating-service-for-8chan/>

that animates my dissertation: ‘What role does IETF culture play in its infrastructural politics?’ My findings reveal and explain how Internet architects make sense of politics, culture and rights, focusing on processes that usually remain obscure for the public they impact. My case study answers my research question by describing the normative and conservative contours of IETF culture, which underpin its dismissal of human rights values as beyond the infrastructural politics of standard-setting. My findings indicate that cultural specificity does not just inform the IETF’s politics, however. The essentialist view of technology, which has long characterised civil society engagement in Internet governance, has ensured that human rights advocates, too, remain committed to a cultural—and for the purpose of advocacy, limiting—belief in the transformative power of technology.

My research approaches questions of infrastructural responsibility and politics through the IETF. The IETF plays a crucial role in maintaining the many moving parts and pieces that make up Internet infrastructure. It is easy to dismiss how astonishing it is that more than half a century after Kleinrock’s ‘lo and behold,’¹⁰⁶ the Internet continues to function, for better or worse. My work examines the politics of standardisation and its intricacies from a critical cultural perspective that is largely missing from Internet governance literature. The case study of the IETF functions as a window onto the role of engineering cultures in Internet governance and onto the largely invisible Internet infrastructure companies more broadly. Debates between such actors unfolded through the IETF in ways that I could not have been privy to in corporate settings.

My focus on culture in and through governance and infrastructure necessitated an ethnographic approach. Through anthropological methods of participant-observation and interviews, I was able to study engineering cultures and decision-making from the ground up. As my fieldwork took place over the course of three years, I was able to cultivate lasting and deeply insightful relationships with the IETF’s leading architects and human rights advocates. These relationships allowed me to see that infrastructural decisions with political effects do not merely result from technical limitations or economic circumstances. Rather, these decisions reflect implicit and often unspoken cultural norms of freedom and responsibility that only become visible *in situ*, through the manifold mundane practices of the engineers that keep the Internet functioning. While my enmeshment in IETF culture was central to my research, I retained a critical

¹⁰⁶ See Chapter One for an abbreviated history of the first attempt to send a message across the Internet’s predecessor and the failure to send more than the first two letters of the word ‘Login’.

perspective on its politics. This dissertation questions some of the IETF's most treasured truths and practices.

The rejection of human rights values by IETF engineers that I document in my dissertation is, on its face, incongruent with how the engineers and Internet governance academics portray the IETF. My research brings the exclusionary nature of IETF culture into view, underlining that the IETF's organisational culture profoundly affects the inclusion of normative values, like those pertaining to human rights, in technology design. Retaining this critical focus on the role of culture in Internet governance, I also connect Internet engineers' sociotechnical imaginaries to their political consequences in both infrastructure design and engineers' response to human rights advocacy. My dissertation documents the limits of what I call the organisation's 'reluctant responsibility' framework. I show that IETF engineers feel a 'reluctant responsibility' for the impact of their decisions, which moves them to intervene in matters of public interest primarily when their preferred politics of freedom and privacy come under threat.

My findings and methods have important implications for academic theoretical thought as well as policy ends. Internet architects' response to civil society calls to consider the rights-eroding properties of their systems reveal how permeable and fluid the boundaries between the 'technical and social functions' of Internet governance are. My focus on the cultural specificity of these boundaries allows me to retheorise how and where they are drawn and redrawn. In terms of policy considerations, an ethnographic account undercuts what I call the IETF's 'engineered innocence', which involves feigning naiveté in the face of critique. Infrastructural companies often leverage this supposed naiveté when faced with public calls for increased accountability, allowing them to maintain their standard-setting power without assuming the associated level of responsibility for the consequences of their design decisions. My dissertation shows that the existence of political consequences is not a surprise for engineers, and the balancing of political effects takes place along culturally specific—and predictable—lines that Internet governance civil society actors, policymakers and academics should be equipped to question.

In the remainder of this chapter, I outline the specific contributions my work makes to three key intersecting debates in Internet governance: those focused on IETF culture, human rights advocacy in Internet governance, and infrastructural politics. I first provide a *Summary of Chapters* that charts the main lines of argument my dissertation has set out. I then concretise and draw together my findings on *The IETF's Closed Culture*, the theoretical and practical

limitations of *Coding Human Rights in Internet Governance*, and the IETF's *Infrastructural Politics of Responsibility*. These sections sum up how my empirical findings contribute to debates in the academic literature from which this dissertation emerges: Internet governance and the anthropology of technology cultures. This allows me to formulate targeted implications of my research for the four key groups at its centre: civil society, infrastructure companies, policymakers, and academics. Finally, I specify the critical interventions my dissertation makes in key Internet governance theories about infrastructure, in order to chart *Future Directions* for research on, and policy efforts by, human rights advocates in Internet governance.

8.2 Summary of Chapters

My research, like the Internet, is composed of layers. The designers of the Internet imagined these layers to be self-contained, a choice that spurred the development of protocols and encouraged the creation of the IETF. My dissertation upends the rigidity of these coded rules: the presumed self-contained nature of layered systems is always laced with dynamics of social interdependence and the affective relations people have to infrastructures (Larkin 2013). My argument, which focuses on these cultural components, similarly runs across my chapters, drawing them together by answering my main research questions and sub-questions.

My main research question asks ‘What role does IETF culture play in its infrastructural politics?’ To answer this question, I answered the following sub-questions in my empirical data chapters:

- Chapter Five: What values, practices, and politics make up IETF culture?
- Chapter Six: What motivates IETF participants to take up or set aside human rights values?
- Chapter Seven: How do IETF participants articulate responsibility for the impact of their protocols and politics on society?

To examine the role of IETF culture in its infrastructural politics, I took human rights advocacy as a case study. My chapters bring the various causes and effects of advocates’ limited success in getting engineers to consider human rights values into view. My findings show that the human rights advocates did not so much shape protocols in the IETF as the IETF shaped their agenda.

The IETF overwhelmed and shifted the advocates' goals and aims with a cultural momentum that I described as conservative and aimed at maintaining the organisation's status-quo of 'non-prescriptive' protocol development. The IETF's culture had such directive force that it encouraged the advocates to formulate their goals and aims in terms palatable to its engineers and their politics. In the process, the advocates lost their ability to repoliticise protocols and push for decisive change to the sociotechnical imaginary of 'protocol non-prescriptiveness' that holds the IETF's conservative culture in place.

Chapter Two focused on the historical sociotechnical imaginary shared by the original architects of the Internet, which still deeply affects IETF engineers' conception of what the Internet is and how it should work. The cultural vision that underpins the Internet's inception rests on the idea that the network of networks was an inherent force for progress, an ontological good. My analysis showed how this historical belief in the liberatory nature of the Internet naturalises the shortcomings, that my anthropological research at the IETF identifies, in current visions for how the material Internet should be. This cultural framework produces the expectation that the Internet "simply" needs to be technically strengthened and grown for it to provide societal benefits. In this sociotechnical imaginary, engineers are simultaneously integral to the world's progress and exempt from directly engaging with the questions of inequity or justice that are usually part of aiming for progress.

Chapter Three explained how my research builds on, and intervenes in, academic debates about Internet governance by incorporating the role of culture and imagination. My work answers outstanding questions concerning the efficacy of human rights advocacy at the IETF, but it also more broadly responds to the recent 'turn to the infrastructure' in Internet governance literature (DeNardis 2012; DeNardis and Musiani 2015; Musiani et al. 2015). I argued that the 'turn to the infrastructure' implies an ultimately untenable epistemic separation between the social and technical functions of Internet governance. My work exposes that the social and technical cannot be separated in practice, through an anthropological approach. Ethnography offers a detailed and bottom-up account of the minds and practices of designers, revealing the inseparability of the various functions of Internet governance. This anthropological focus also allowed me to reframe the academic conversation about the efficacy of human rights advocates in the IETF. Instead of focusing on whether or not these efforts are successful, I argued that the question is *how* the advocates' approaches might be limited. Process-oriented, descriptive accounts can bring into view how power relations and conflicting worldviews shape impact.

Chapter Four laid out the research approach, detailing what anthropological accounts of culture and power have to offer to ongoing discussions about Internet governance. Approaching standardisation practices from the ground up and through the eyes of those directly involved, through ethnographic methods, reveals the affective dimensions of Internet governance. My ethnographic approach allowed me to harmonise the IETF's reputation as open and accessible with its reality as a closed-off engineering organisation. A focus on culture and power also nuances the common notion that IETF interventions in response to privacy violations perpetrated by governments, like those revealed by Snowden, indicate that IETF engineers embrace human rights values. My anthropological perspective demonstrated that IETF responses reflect a cultural commitment to radical self-regulation, free speech, and privacy that is in practice deeply conservative.

Chapter Five situated the particularities of IETF culture in the larger cultural frameworks that include gendered and racialised norms and expectations in Internet governance. I showed that day-to-day functioning of the IETF is rooted in a historically and culturally specific ideal of 'rugged masculinity'. Gaining respect and success within the organisation depends on the skilful performance of an approach to engineering that is virtually inseparable from cultural practices and presentations associated with masculinity in Europe and North America: detached, technical, playful or irreverent, and individualistic. This narrow formula for success makes the IETF's culture and working practices exclusionary to women and participants from the Global South, as well as to individuals perceived as 'overly political', like many engaged in human rights advocacy. The cultural specificity of the working practices and narratives that characterise the IETF explain why and how human rights interventions were seen as external to, and incommensurate with, good engineering.

Chapter Six used ethnographic details about IETF culture to explain its rejection of human rights values. IETF culture and advocates' adherence to it, limits their ability to foment cultural change or introduce new values to standardisation. The IETF's incumbent participant base understands human rights as linked to State intervention, a culturally and politically specific association that is often left unspoken but strongly informs engineers' reaction to advocacy. The engineers see human rights as distinctly belonging to the realm of States and worry that including them in standardisation will undermine the IETF's self-regulatory governance model and its distinctly non-prescriptive approach to networking. My research also revealed that human rights advocates have anticipated this objection, striving to follow the IETF's policies and procedures closely to

underline their belonging. I showed that this approach limits the difference that human rights efforts can make because this adaptation involves inadvertently mimicking the IETF's anti-political engineering ethos and tying their work to the IETF's liberal protocol politics.

Chapter Seven described the sociotechnical imaginaries that guide IETF engineers in their work. Teasing out the political dimensions of sociotechnical imaginaries, my ethnographic details expose how culture affects the assumption and refusal of responsibility. The imaginary of 'protocol non-prescriptiveness' underpins IETF participants' feeling that they cannot and should not prescribe how their protocols are used. This chapter also described the approach that drives advocacy efforts, which is 'tech-essentialist' in its rendition of technology as the primary locus for societal change (Cohen 2019; Myers-West 2021). Relying on interviews and observations, I analysed how the understanding of responsibility that emerges from the IETF engineers' ideological commitment to 'protocol non-prescriptiveness' chafes against the perceived prescriptive views of responsibility articulated by the human rights advocates.

This conclusion distils the argument that runs through these chapters, describing the constitutive effect that the IETF's culture has had on the human rights advocacy efforts. The human rights advocates had to make their work palatable to IETF engineers, which involved translating their demands and values to the IETF's cultural frames. The advocates adapted their ambitions to the IETF's narrow and anti-political engineering ethos, which was in many ways antithetical to the desire to repoliticise protocols. The points where no such adaptations were needed are just as insightful: the advocates' basic philosophy drew from a tech-essentialist legacy of advocacy, pervasive among early Internet architects and civil society organisations, that overstates the transformational potential of technology. In what follows, I explain how my findings illuminate the topics at the heart of this dissertation: IETF culture, human rights advocacy in Internet governance, and infrastructural politics.

8.3 The IETF's Closed Culture

My ethnographic case study of IETF culture reframes the academic literature about this organisation. While academics have largely been silent on the IETF's cultural contours, work that does touch on this dimension of governance tends to be positive. In non-ethnographic analyses of its culture, the IETF is seen as an example of open and accessible Internet governance

(Abbate 2000; Bygrave and Michaelsen 2009; DeNardis 2011). Some of this praise holds merit. The IETF is indeed unique in its open governance structure, a reality that made this ethnographic research possible. Had the IETF, like many analogous organisations, been closed off to all but governments, industry players, or those able to pay hefty entry fees, my fieldwork would have been impossible. Still, my work sharply departs from these glowing assessments of IETF culture, using ethnographic methods to bring to the surface the exclusionary and conservative effects of its seeming openness.

My empirical chapters describe how the IETF's cultural practices affect the ability of women, Global South, and human rights participants to join and participate. The exclusionary effect of IETF culture is a key finding of this research. Included in my set of standard questions for all interviewees were multiple prompts asking them to describe the IETF's organisational culture (see Appendix III). Given my prior experience in the IETF, I was already familiar with the particularities of its confrontational working practices and 'loud men talking loudly' collaborative ethos (Cath 2021; 2020). Some of my interviewees saw these dynamics as marginal to the importance of the IETF as 'the place where the Internet was made.' Others drew a direct line between such touted accomplishments of the IETF and aggressive or confrontation-focused working styles. As one interviewee put it, 'We don't respect all opinions, we want it to be a little bit hard for you to join a mailing list or author a draft, we don't want this to be super easy'. The crux here, of course, is who the implied 'you' is in this directive.

One example from my empirical chapters stands out. During the IETF's newcomer trainings, first-time participants were introduced to the brash behaviours that are a normal part of the organisation's functioning. But rather than being told to call out such acts, the newcomers were encouraged to accept and embrace them. This naturalised new members into accepting aggressive behaviour not just as par for the course, but as part of what goes into engineers' development of good standards. Put differently, the IETF's organisational culture not only condones offensive conduct, but also actively cultivates it. It is not difficult to imagine for whom the adoption of the desired behaviours and attitudes comes easier, and many engineers I spoke with do explicitly intend for the IETF to remain an 'Old Boys Club'. These engineers actively press for the maintenance of cultural traits that make the organisation hard to access for most people outside the white Western men that make up the dominant group in the IETF currently.

Many of my research participants would likely dispute my assessment by pointing towards the IETF's recent efforts to address aggression, as well as racism and sexism. They have many accomplishments to mention, including the Diversity Design Team set up in 2013, the publication of RFC 7776 'IETF Anti-Harassment Procedures'¹⁰⁷ and community-wide recognition of the need for change. These sentiments and actions are genuine, and some of my interviewees passionately advocated for changing these norms. The far majority is well-intentioned, but engineers are overwhelmingly unaware of how the IETF's norms and values create a hostile working environment that runs counter to its diversity and inclusion efforts. In light of the IETF's informal and cabalistic culture that upholds this lack of awareness, these recent diversity and inclusion efforts remain a drop in the ocean.

Internet governance literature does not capture what my interviewees from the Global South have described as the 'hell of bureaucracy, just to attend'. Even when written by authors who spent time with IETF engineers, the literature does not reflect on the sexism that women, including myself, had to contend with at the IETF, both during its offline meetings and in online exchanges. This oversight is especially concerning given the tendency in academic and policy conversations about Internet governance to consider the IETF as a blueprint or example for how to govern the Internet (Hofmann 2007; Mueller 2010). My work reframes the assumptions that underpin such positive assessments of IETF culture through rigorous empiricism: first-hand ethnographic accounts shed new light on how the IETF's culture functions in practice, and to what effect. The structural lack of knowledge about the political effects of the IETF's cultural day-to-day functioning suggests that there is an urgent need for further anthropological exploration not just of the IETF, but of Internet governance organisations more broadly. The potential of anthropology is another core finding of my research.

Taken together, my analytical emphasis on culture and my ethnographic findings of its political effects inform my thinking about how the IETF might change. The cultural rootedness of the IETF's 'rough consensus and running code' working ethos and its preference for informal networks over corporate norms means that a veritable sea of cultural change will be needed for its incidental diversity and anti-harassment efforts to have an effect. Such changes need to start with the professionalisation of the IETF's culture. My participants' preferred self-description—

¹⁰⁷ For the full text see: RFC 7776. *IETF Anti-Harassment Procedures*. Pete Resnick and Adrian Farrel. <https://datatracker.ietf.org/doc/rfc7776/>. December 2018.

‘informal engineers coming together on their personal title to work for the good of the Internet’—simply no longer holds. The IETF is an organisation of 1000+ primarily corporate engineers who define the future of the Internet through their decisions, including those involving rights, markets and geopolitics. It is time for its culture to reflect this scale. Such change is not unprecedented: the IETF updated its governance structure when there was community consensus that its informality no longer reflected its importance and size.¹⁰⁸

The process of changing IETF culture to address its exclusionary effects might begin with critical reflection on which inherited narratives, imaginaries and practices are appropriate for its present-day incarnation and which should no longer be maintained. Anthropological literature can help bring these cultural components and their effects into view. Academics in anthropology and history have described the masculine and rugged approach to engineering that informs the aggressive and confrontational working styles and attitudes at the IETF (Brooke 2019; Dunbar-Hester 2019; Ensmenger 2015; Reagle 2013; Traweek 1992). My ethnographic work also reveals the cultural specificity of the political preferences the IETF evinces: a distinctly North American investment in voluntarism, freedom and individualism.

I do not see these—or any other—cultural barriers as fixed and insurmountable. In fact, it is precisely those cultural barriers and their roots in distinct sociocultural imaginaries that articulate visions for a (future) Internet that should be the primary point of interest for academics (un)willing to write off human rights advocacy in the IETF as a ‘requiem for a dream’ (Mueller and Badiei 2019). The ability to excavate the political commitments of major Internet infrastructure organisations and then push for change effectively rests on fine-grained and critical empirical accounts of Internet governance cultures.

¹⁰⁸ The IETF’s leadership recently explicitly recognised the need for such cultural change. In his first communication as the new IETF chair (March 2021), Lars Eggert outlined that IETF participants expect it to become ‘a more professional organisation’. Yet, Eggert mentions the fear of some engineers that this professionalisation will lead to a loss of the IETF’s current informal culture. <https://web.archive.org/web/20210315214559/https://www.ietf.org/blog/new-ietf-chair-lars-eggert/>

8.4 Coding Human Rights in Internet Governance

My research reveals that human rights work at the IETF routinely, and perhaps unavoidably, falls short of its stated aim: ‘to protect the Internet as a human right enabling environment’.¹⁰⁹ That is not to say that the advocates’ efforts were meritless. My case study at the IETF shows that changing how protocols function can, in some cases, be an important step in halting the rights-eroding impact of Internet infrastructure. The advocates’ strategy of pushing for incremental improvements in standard development led to fixes that addressed technical issues like data leakages or faulty encryption schemes.

More broadly, the human rights advocates’ efforts to repoliticise protocol development and foster a more inclusive culture have been key accomplishments. Their interventions tried to amend the sociotechnical imaginaries that underpin protocol development in the IETF, arguing for a view of engineering as political work. The human rights research group in the Internet Research Task Force (IRTF) served as a safe landing pad for researchers and members of the broader human rights community, providing mentorship and support to those who were new to infrastructure politics. The advocates’ work added underrepresented views and values to the IETF, widening its corporate and homogenous participant base.

In order for their work to be effective in these ways, the human rights advocates had to build alliances with the corporate engineers that make up the IETF. Such alliances were a ‘necessary evil’, as one interviewee described it, because the advocates’ limited cultural clout in the organisation meant that they struggled for a seat at the table. Connecting their human rights values to the emphasis on privacy and individual freedom that characterises IETF culture was integral to building these much-needed alliances. Because their ability to speak out and be heard on technical matters depended on this overlap, advocates were hesitant to articulate their concerns in terms that questioned the IETF’s self-regulatory governance structure or proposed radical reforms to the exclusionary aspects of its culture.

In this sense, the advocates’ overall approach fell victim to the trap of what Green calls strategies that make ‘improvements in the local vicinity of the status quo’ (2019b, 3). Working with the

¹⁰⁹ For a comprehensive overview of the human rights advocates’ aims and goals see: <https://web.archive.org/web/20210212044445/https://datatracker.ietf.org/rg/hrpc/about/>

cultural status quo, as many other ethnographers of technology have argued, makes it much more likely for changemakers to overlook how this very status quo underpins and causes some of the most salient human rights concerns raised by the development of the Internet (Dunbar-Hester 2019; Noble and Roberts 2019; Paris 2020). My ethnographic approach allows me to give descriptive depth to advocates' negotiation of the proximity to, and dependency on, the organisation they aimed to change, bringing into view what hampered advocates' impact and how these limits might be addressed.

A key factor complicating advocates' ability to shape Internet standards in the IETF is the limited clout they had in the organisation. In theory, human rights advocates represent the concerns of the global population. But they had considerable difficulty summoning the corporate and cultural clout that holds power over protocols in practice. By their own admissions, the advocates were only able to make changes to protocols when their proposed changes were in line with the IETF's commercial members' objectives. One of my interviewees lamented, 'Everyone loves latency wins, who doesn't want the Internet to go faster? But getting them [corporate engineers] to care in the same way for rights, much harder'. This meant that the advocates were most effective when they were able to develop alliances with big players. In some cases, like when participants in the human rights group represented companies with a clear public interest mandate, the alliances were a natural fit, for which the advocates did not have to compromise their guiding principles. In most cases, however, this dependency resulted in strange bedfellows and temporary collaborations on singular issues.

Concerns that could not be translated into terms and topics that IETF culture values routinely went unheard. My review of the literature on the role of civil society interventions in Internet governance suggests that these findings show the structural disempowerment of the human rights advocates. I agree with Morris (2011) that the advocates' contributions raise important, underrepresented concerns. But my findings primarily reinforce the arguments of Myers-West (2017) and Carr (2015), who both argue that unequal power dynamics threaten the most heralded benefit of open governance structures in Internet governance organisations: civil society's ability to join conversations. In my case, the problem was not that human rights wound up legitimising (inequities in) the IETF's governance structure (Carr 2015, 642). Rather, the problem was that the IETF's culture and the politics emerging from it required extreme adaptability from the human rights advocates. In order to not just take their seat at the table but also be heard, advocates' efforts had to be made to fit narrow corporate concerns and alliances.

But it was not just the advocates' marginalised position within the IETF and the cultural compromising it required that hampered their work. Their guiding philosophy was another limitation. The human rights advocates worked with a foundational theory of change that guided their efforts. As described in Chapter Three, their methods drew from a policy paper that mapped protocol principles onto human rights principles to argue that the overlap between them meant that protocols could be designed to uphold human rights. My analysis showed that this central premise, that there are values common to both the IETF and human rights advocacy communities, is inherently flawed. The IETF's guiding principles and its de facto governance are starkly different from those articulated in international human rights frameworks.

The advocates' guiding philosophy mistakes the IETF's commitment to a limited number of values, like privacy, for a broad affinity for human rights values. This meant that the human rights advocates make erroneous assumptions about the existence of natural affection for human rights concerns within the IETF. Advocates' push for the inclusion of human rights values, in combination with what was perceived as their prescriptive approach, in fact, led to active hostility by the engineers against human rights efforts. Future research on civil society participation in Internet governance must consider the hurdles posed by organisational cultures that dull or reject advocacy efforts.

Turning an eye to culture also reveals that human rights advocates' work is inherently limited when they approach Internet governance through standards and protocols alone. As long as the advocates do not extend their efforts to the underlying cultural dynamics that incentivise the development of technology with rights-eroding properties, they are unlikely to effectively address the broader human rights concerns raised by IETF protocols. The human rights advocates were aware of the larger loop of changes needed for their work to have its intended effect. This makes it striking that they engaged the world outside of the IETF so sparingly in their work.

Deployment and implementing communities, policymakers, government offices of public procurement, and other regulators would have made for helpful conversation partners in pushing for change. Paris has noted that 'if the future Internet is to promote positive sociotechnical relationships, its architects must recognise that complex social and political decisions pervade each step of technical work and do more to honour this fact' (2020, 2). My work shows that this is also the case for civil society trying to advance social causes through Internet infrastructure.

Effective advocacy requires much broader engagement with the legal, political, cultural and economic factors that shape protocol outcomes.

Technologies cannot easily be developed such that their impacts are inherently good, or bad, for societal values. The advocates' view of the relationship between technology and society limited the scope of their work and its impact before it began. The updates advocates fought for did not automatically address the human rights-eroding properties arising from Internet standards because many of these are simply not technical in nature: they are cultural. I described the advocates' overly optimistic appraisal of the ability of technology to foment societal change as 'tech-essentialist' (Cohen 2019, 4; Myers-West 2021, 9). The advocates located much of the potential for political change in technology itself rather than in the wider context of its design and employment. People, not just technologies, should be seen as central to the advancement of political goals like social justice, anti-discrimination, and human rights (Gangadharan and Niklas 2019; Myers-West 2021; Paris 2020).

Directing civil society efforts primarily towards technology inevitably falls short of inducing transformation. This approach inadvertently reaffirms that niche technical skills will set in motion societal changes that are always also cultural. The overfocus on technology that my dissertation documents is a problem in human rights advocacy frameworks far beyond standard-setting organisations. The broader civil society sector routinely roots its theories of change in outdated notions of the Internet's inherent liberatory potential, neglecting to critically question the constitutional visions of early Internet architects and subsequent generations of cyberlibertarians. Recognising these visions as culturally specific and widespread makes their political reach visible in ways that will strengthen civil society efforts to push for political change.

My findings suggest that the human rights sector—including some of the organisations borne out of the Internet's creation—needs to re-evaluate its frameworks and policy approaches, which often draw from flat assumptions about technology as a tool for enabling or restricting rights or freedoms. Technology-focused work promotes an inherently limited vision of change, so the human rights sector needs to look beyond technology if it wants to be more impactful.

To fundamentally unsettle the cultural values of the IETF, and by extension its politics of reluctant responsibility, advocates will have to develop alternative visions for what Internet technology can or will be. Sociotechnical imaginaries shape the social and material make-up of

standards. Imaginaries that draw from Black, feminist and queer perspectives seem especially promising for envisioning a better Internet (Benjamin 2019a, 2019b; Browne 2015; Myers-West 2021; Paris 2020). The development and elaboration of new and progressive imaginaries will be necessary to change the social conditions in technology communities of practice, so that they will build infrastructures that have rights and justice concerns at their core.

This revisioning of the Internet and the role of civil society would also address the limited ability of the international human rights framework to account for the myriad social barriers to participation in Internet governance my research has identified. Human rights frameworks often remain rooted in statist intervention and legal change, which does not always translate well to industry-led governance organisations like the IETF. Effective advocacy in Internet governance will need to address the larger cultural ecosystem of technologies' use and development first, pursuing change broadly and imaginatively.

8.5 Infrastructural Politics of Responsibility

My findings show that IETF engineers make sense of technology, human rights, and their responsibility for the political impact of standards in culturally specific ways. By critically questioning this culture and its treatment of responsibility, I demonstrated why the IETF's public self-narration as a neutral and anti-political organisation is untenable. Not only does this narrative deny the political impacts all technical organisations have but it is also incongruent with how IETF engineers think of their work. In private conversations, many engineers readily admitted that they engaged in political decision-making. The engineers connected their reluctance to speak of these politics publicly to their fear of undermining the IETF's ability to self-regulate. I described this stance as 'engineered innocence' and explained that this position is actively harmful: it allows the IETF to respond to political questions at will and without accountability. The dynamic of overt self-regulation and unacknowledged politics that I witnessed at the IETF has important implications for conversations about self-regulation in Internet infrastructure more broadly.

To bring the infrastructural politics of the IETF to the surface, I introduced the concept of 'protocol non-prescriptiveness', which is a guiding social and material value in the IETF. This orientation to technology dictates that IETF participants cannot and should not prescribe how

their products are used. It is a political adage that derives its power from the sociotechnical imaginary that is dominant in the IETF, in which the Internet is fundamentally good, voluntary and opt-in. This imaginary and the resultant cultural idealisation of non-prescriptiveness structures an infrastructural politics of ‘reluctant responsibility.’ These politics inform engineers’ arguments that standards only have bad consequences due to faulty implementations after they leave the IETF’s realm of responsibility, as well as their arguments that the IETF cannot prescribe how protocols are used beyond that realm. My work uses the concept of ‘engineered innocence’ to show that engineers are aware of their political agency: they are purposefully reluctant to assume political responsibility for outcomes, rather than genuinely clueless about it.

My findings bring into view how the IETFs distinct political culture naturalises its organisational structure. Protocol politics at the IETF are overwhelmingly liberal in orientation. The IETF envisions the end-user as autonomous and responsible, making the user of protocols indistinguishable from the self-directed individual engineer assumed to have built them. This political ‘fit’ between protocol engineers and the end-users of protocols (including implementers) makes the IETF’s self-regulatory governance structure feel natural: because the protocol implementer is solely responsible for flawed uses of standards, the engineers building them should not have to face oversight from States or human rights advocates. Pointing to liberal ideals of voluntarism and autonomy, IETF engineers push responsibility for societal impacts down to end-users and implementers, maintaining an engineered innocence that shields the organisation from external oversight.

My dissertation argues against the IETF’s self-image as an organisation that is not, or only rarely, engaged in political decision-making. The political and economic possibilities instantiated outside the IETF through particular design decisions are an intrinsic part of their constitution inside the organisation. The most heated technical discussions in the IETF focus on the ‘externalities’ of standards: the economic and political effects they have once they are deployed. Technical arguments debated what a particular solution would mean once the standard was in use: who would have access to the meta-data, what entities would be able to track what happens on their networks, whose services would be likely to become a fraction faster and thereby generate more income. In these discussions, the engineers frame some effects of standards as technical deliberations (e.g., which companies retain control over information flows in their network) that IETF engineers should be thinking about, while others are presented as beyond the IETF’s scope (e.g., negative outcomes for human rights values).

Close attention to these cultural dynamics can explain how IETF engineers draw boundaries around the outcomes for which they feel responsible and the ones they do not consider part of engineering or design. On balance, the IETF rejects demands for the inclusion of human rights values in design decisions. This is a culturally motivated rejection: IETF engineers perceive these demands as requiring an approach to engineering that is at odds with their existing cultural assumptions about the nature of protocols and the Internet. While the IETF is reluctant to respond to calls for considering the public good, the organisation acts much more decisively in response to government surveillance.

The same set of cultural beliefs and social processes underpins both responses. Engineers often honour political demands to protect privacy from government interference. Likewise, they are positively inclined to consider economic questions related to bandwidth efficiency and latency part of their mandate. In this sense, the IETF's engineers do exercise political power and authority, making decisions that intervene on behalf of the public good. They do this when intervention is compatible with the IETF's existing incentives and organisational structures. These interventions focus on issues involving privacy, self-regulation, and government influence that have cultural currency with the engineers who are committed to liberal protocol politics and a specific vision of what the Internet should be. Opting in and out of explicit politics is always culturally motivated. But I argue IETF engineers cannot have it both ways: visibly preventing some cultural effects while structurally refusing accountability for others.

To understand infrastructural politics, it is important to listen to 'what the purveyors of a given technology say' (Hoffmann 2014, 1). IETF engineers often deny their political positioning and how it shapes their design choices. Yet, my ethnographic analysis reveals that they are actively engaged in political decision-making whenever the engineers opt to consider something as technical and therefore relevant, or political and therefore irrelevant to Internet infrastructure. Academics sometimes understand the IETF's willingness to stand up against government surveillance as a sign of its commitment to human rights and civic values (Braman 2011a; Rachovitsa 2016a).

My findings show that this understanding is an overly hasty confusion of the part for the whole. The IETF acts on a limited number of, to the engineers, culturally salient concerns rather than on a broad range of human rights. Even though calls for transparency about decision-making

have increased, infrastructure companies routinely deny or downplay the political dimensions of infrastructural work, and the IETF reflects this trend. My dissertation reveals the cultural values and dynamics that allow IETF engineers to approach technical systems in their distinctly anti-political way by using what they say and do to resurface their political choices.

My research has important implications for future engagements with questions of infrastructural responsibility and Internet governance. Academics need to pursue detailed analyses of infrastructural politics that take cultural specificity into account so that they do not confuse limited intervention for holistic action. Furthermore, the muted and culturally motivated sense of moral responsibility felt by IETF participants for the political effects of their work should act as an advanced warning against letting technical communities define the boundaries of responsibility in distributed systems without oversight or critical analysis.

Given the significant overlap between engineers in infrastructural companies and IETF attendees, the IETF's unwillingness to consider human rights discussions part of its mandate foreshadows how ready and willing Internet infrastructure corporations will be to respond to public calls for increased transparency and accountability. This lack of responsiveness makes the infrastructure actors' reluctance to take responsibility even more troublesome. Even if it becomes possible to devise engineering solutions that address human rights concerns, however limited the impact of such solutions might be, what good are those efforts when they are applied selectively, without accountability or consistency to the public? Here, too, a critical analysis of culture at the IETF can help resurface what (and whose) public interests infrastructural engineers are willing to safeguard through their design choices.

My analysis repoliticises engineering debates and decisions that IETF culture purposefully renders apolitical. This allows me to make several recommendations for cultural changes within the IETF that would improve its infrastructural politics by allowing its technologies to serve a broader public than the imagined 'end-users' who so resemble the liberal ideal of the autonomous engineer. First off, the IETF needs to develop more structured and accountable answers to the social demands civil society actors put on the network, this includes the demands of civil society beyond the human rights advocates featured in this case study. In many debates, and, especially in those revolving around gender equity, the 'gut response' of the engineers is the opposite of what would be needed to improve the ability of underrepresented groups to function in Internet governance. Building structures that allow the organisation to attend to the existing

complaints of underrepresented groups will be key to shifting this dependency on unstated instincts.

Relatedly, the IETF needs to be more upfront about how its engineers' culturally determined political commitments guide their decisions. The current cultural attitude to responsibility in the IETF, however lacking, drives its response to civil society actors' various social and political demands. Owning the arbitrariness and specificity of the IETF's engineers' priorities would necessitate no longer styling them as technical matters. This would open infrastructural decision-making and its political effects up to more rigorous questioning and appraisal from civil society actors, policymakers and academics alike.

8.6 Future Directions for Internet Governance

My findings and methods have important implications for Internet governance, from the theorisation of infrastructure and the need for closer attention to power dynamics, to the role of academics in Internet mythologies and the pressing matter of accountability. My ethnography of the IETF offers descriptive depth to the close connections between culture and code. This method has theoretical consequences for the 'infrastructural turn' in Internet governance research (DeNardis 2012; DeNardis and Musiani 2015; Musiani et al. 2015). Literature in the infrastructural turn argues that Internet governance academics should note how the Internet's infrastructure gets used or co-opted for purposes 'beyond their original constructed technical and policy functions' (DeNardis and Musiani 2015, 3).

My findings suggest that this reading of infrastructure is overly deterministic. Underlying the idea that 'primary Internet governance functions' can be co-opted is the assumption that the technical and policy functions of the Internet's infrastructure are fixed and predetermined (DeNardis 2012, 721). Otherwise, it would not be possible to distinguish meaningfully between the normal technical use of such functions and their co-optation for political ends. My ethnographic descriptions, however, reveal that the boundaries between the technical and the social are profoundly porous. My work on the IETF shows that the very ability to section off the 'primary technical and policy functions' of Internet infrastructure depends on culturally situated imaginaries that envision the Internet as having original and external functions.

This theoretical movement that characterises the infrastructural turn invokes a view of the Internet as a single and stable entity across time, whose social and technical functions arose independently from each other and their larger historical context. My dissertation troubles this imaginary by tracing Internet infrastructure across time as a cultural formation, from its early development to its current functioning. My analysis demonstrates that developing static indicators to define the boundaries between infrastructure's social and technical functions or to define co-optation of the infrastructure is a futile endeavour. Instead of the political co-optation of its technical functions, my findings resonate with Larkin's theory that the changing political uses of the Internet's infrastructure reflect a cultural 'rearrangement of the hierarchy of functions' (Larkin 2013, 335). These theoretical distinctions are important. As long as they uncritically accept the idea that the social and technical functions of infrastructure can be separated from one another, Internet governance academics will struggle to substantially critique technical organisations (like standard-setting bodies) that reject social values (like human rights) as part of their work.

My findings and their theoretical implications underline that anthropological methods will be especially promising in future Internet governance research. The cultural imaginaries that sanction or forbid particular uses of the network should be a key point of interest for academics interested in human rights, Internet governance, and infrastructural politics. Relatedly, anthropological research brings into concrete view how cultural imaginaries underpin both the political impacts of technical protocols and the engineers' reluctance to assume responsibility for these consequences. In short, analytical attention to the ways in which engineers draw culture and code together in practice will be integral to troubling the cultural distinctions that shield Internet infrastructure actors from the pressing political question of human rights.

More sophisticated engagement of culture in Internet governance scholarship should also curb the impulse to describe particular Internet governance organisations as exemplary. Such designations often depend on ignoring or disregarding the exclusionary effects of cultural dynamics and associated behaviours. My dissertation focused on sexism in the IETF, revealing how the organisation's working practices made it difficult for women to join the ranks of engineers. Internet governance-adjacent spaces like technology workers unions and open-technology communities are increasingly addressing institutional racism and sexism explicitly (Dunbar-Hester 2019; Tarnoff 2019). Internet governance academics should heed this call to analyse the perpetuation of discrimination and exclusion in governance practices and domains

that are assumed to be important and effective. An important goal for future research in this vein will be to show that ‘good’ decision-making in Internet governance organisations does not require antiquated working practices or politics that also (inadvertently) sanction institutional discrimination. The development of good technology is fully possible in safe and welcoming spaces.

A more accurate accounting for cultural dynamics of exclusion in Internet governance organisations will require that the research community engages disciplines with robust literatures on these topics, like gender studies, critical race studies, cultural studies and cultural anthropology. These subfields can equip Internet governance academics to notice how and where governance processes define power dynamics in favour of its most powerful participants. I focused specifically on sexism within the IETF in the context of human rights advocacy, but there is much more to flesh out concerning the effects of the IETF’s rugged and masculine approach to engineering on the ability of women (and non-binary individuals) to participate on equal footing with their male counterparts or get ahead in IETF leadership. Future research might also bring into view how racism—of which there was plenty—affects participation. There are numerous other threads that I had to leave unpicked in this work, such as the IETF’s famed informality and its implications for the cultural dominance of American companies in the organisation, brought into sharp relief by Chinese companies’ attempts to gain in stature.

A critical study of cultural dynamics will ensure that academics of Internet governance do not lose sight of the internal politics of organisations in the infrastructural domain. My work demonstrates how engineering imaginaries and practices inhibit crucial discussions about equity and justice in design. A foundational cultural belief in the inevitability of the progressive future the Internet ushers in masked political realities that an anthropology of power can reveal. My research did not just consider Internet architects, but also critically examined the ideologies that drive civil society, showing how these are intertwined with, and diverge from, the imaginaries that drive the Internet’s historic and current development.

This ethnographic focus on cultural specificity reveals where current visions for the future of the Internet, articulated by engineers, civil society, academics and policymakers alike, stop short of truly rethinking the power dynamics driving the development of the Internet’s infrastructure. A focus on cultural values and their articulation across different domains in Internet governance repoliticises infrastructure, making it possible to style technical decisions as explicitly political,

rather than neutral or apolitical. Dissecting how widely shared culturally defined norms and values shape the Internet's composition reveals why it is so difficult for civil society to imagine and demand changes to its politics and governance.

Critical ethnographic research of Internet governance organisations is also important because it pushes academics to see their own part in the phenomena they study. Internet governance academics would do well to consider themselves as part of the cultural imaginaries that underpin the politics they study. The view that there is something inherently liberatory about the Internet is a regular example. Academic work can aid in the perpetuation of myths about the practice of Internet governance that organisations like the IETF would prefer to uphold. Since the so-called 'reflexive turn' (Behar and Gordon 1996; Clifford and Marcus 2010), the discipline of anthropology has developed a sophisticated theoretical toolkit for analysing the cultural overlap between researchers and their objects of study.

The community of academics that make up the field of Internet governance is no exception to this entanglement with its object of study. As such, it is time for the discipline to reckon explicitly with the political preferences expressed through its disciplinary approaches and the predominantly white and Western perspectives it represents. As Internet governance scholarship enters a new phase, which I detailed in Chapter Three as the fourth phase of research moving towards critical Internet governance, the field can borrow from anthropology in further reflecting on the role of the academy in shaping Internet governance practices along the lines of its academics' preferred disciplines and politics.

To design an Internet that serves the public good rather than the whims of industry, we need to find new ways to hold the Internet's 'reluctant sheriffs' (Van Geuns and Cath 2020) accountable, whether they run corporations or Internet governance organisations. In this dissertation, I showed the limits of pursuing such accountability through direct human rights advocacy efforts in the IETF. My work also dispels with the notion that the sporadic justice meted out by infrastructural companies can be heralded as a sign of their commitment to public values. I show that IETF engineers only intervene in debates touching on the public's interest when what they consider to be important concerns—often commercial outcomes or liberal values—are under threat.

Scholarship and policy should avoid conflating such actions with the idea of infrastructural actors as forthright custodians of public values. Overestimating the infrastructural companies' commitment to protecting shared societal values is not just a mistake, it is also dangerous, because it puts them in a position of trust. It does not make sense to trust that infrastructural organisations will act on the public's interest on their own accord when they have proven to do so only in a limited and culturally determined number of situations. Blindly trusting in these companies' willingness to 'take care' of rights-eroding situations stymies the much-needed development of democratic measures to ensure that private actors provide a systematic response to human rights and justice concerns.

The need for new ways to hold Internet companies accountable is especially stark in light of the limited effectiveness of civil society actors who strive to hold them accountable through direct oversight. My findings demonstrate that the direct engagement of human rights advocates in the IETF did not lead to a robust accountability framework for infrastructural decision-making. The advocates' limited success underlines the need for new, creative research on how accountability in distributed systems can be made to meet democratic standards. What oversight measures are fit for this purpose? One further relevant question for future research, in light of this, concerns the limitations of applying the international human rights framework to 'Big Tech'. There are many untapped legal, commercial, cultural, and even technical approaches available that can help contain technology companies. My recommendation for Internet governance research is to broaden its research agenda considerably and begin to question many of the latent but formative assumptions about the Internet in the field.

Finally, my research should present a clear message to advocates, public interest technologists, and other civil society actors. The experience of human rights advocates in the IETF shows that civil society risks compromising on its goals, aims and missions when it encounters different cultural views on technology. The IETF's cultural frames around human rights and technological infrastructure overwhelmed and crowded out advocacy, and this was possible *because*, not in spite of, the fact that advocates had a seat at the table of IETF. Human rights advocates will only be able to successfully develop alternative imaginaries once they have intimate knowledge of the existing visions that animate Internet governance organisations like the IETF and the cultural power these visions exert. Anthropological research in Internet governance will help map the cultural domain into which civil society will have to intervene.

This case study offers practical insights for other types of advocacy around ‘Big Tech’ and should help civil society actors understand why current public debates about infrastructural politics take shape as they do. For interventions in these debates to be effective, my research demonstrates that civil society will need to engage in the design of cultural value systems as much as it does in updating technical systems. The central policy contribution of this dissertation emerges from its theoretical and methodological contributions concerning the permeability of the boundaries between the Internet’s social and technical functions and the importance of culture throughout infrastructure. To shape Internet governance through rights-based advocacy, civil society must ensure they are focussed on changing minds as much as they are on changing machines.

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Appendix I: Research Question Matrix

Research Question	Methods	Data Sources	Chapter	Adds to Literature on
<p>What role does IETF culture play in its infrastructural politics?</p>	<p>Participant observation</p> <p>Elite interviews</p> <p>Archival and document analysis</p>	<p>Fieldnotes, memos and log</p> <p>Mailing lists</p> <p>Interview transcripts, recordings, and contextual memos</p> <p>Archival data: mailing list archives, video recordings of previous meetings, Github repositories, IETF blogs on internetworking and its statistics, participation in other Internet governance organisations.</p> <p>Document data: RFCs, Internet-Drafts (I-D), IETF Tao, newcomers training modules, tweets, press coverage and statements, policy documents, email correspondence with authors, conference proceedings.</p>	<p>All</p>	<p>Internet governance, including infrastructure and protocol politics</p> <p>Anthropology of Technology</p> <p>IETF culture</p> <p>Human rights advocacy in Internet</p> <p>Turn to the infrastructure</p>
<p>↓ The technical and social functions of Internet governance are inseparable & protocol development is shaped by culture ↓</p>				
<p>What values, practices, and politics make up IETF culture?</p>	<p>Participant observation</p> <p>Elite interviews</p> <p>Archival and document analysis</p>	<p>Fieldnotes and memos</p> <p>Mailing lists</p> <p>Interview transcripts, recordings, and contextual memos</p> <p>Mailing list archives, RFCs, Internet-Drafts (I-D), IETF protocol journal, video recordings of previous meetings, IETF Tao,</p>	<p>Chapter Five</p>	<p>IETF culture</p>

		newcomers training modules, IETF blogs on internetworking and its statistics, participation in other Internet governance organisations.		
↓ IETF culture is conservative in what it does, liberal in what it accepts ↓				
What motivates IETF participants to take up or set aside human rights values?	Participant observation Elite interviews Archival and document analysis	Fieldnotes and memos Mailing lists Interview transcripts, recordings, and contextual memos Mailing list archives, RFCs, Internet-Drafts (I-D), IETF protocol journal, video recordings of previous meetings, tweets, press releases and coverage, conference proceedings, policy documents, email correspondence with authors.	Chapter Six	Human rights advocacy in Internet
↓ Cultural perceptions of human rights as binding & State interference hinder efforts of human rights advocates ↓				
How do IETF participants articulate responsibility for the impact of their protocols and politics on society?	Participant observation Elite interviews Archival and document analysis	Fieldnotes and memos Mailing lists Interview transcripts and recordings Mailing list archives, RFCs, Internet-Drafts (I-D), IETF protocol journal, video recordings of previous meetings, tweets, press releases and coverage, conference proceedings, Github repositories, IETF blogs on internetworking	Chapter Seven	Turn to the infrastructure

		and its statistics, participation in other Internet governance organisations.		
Conclusions and Policy Implications				<p>Internet governance, including infrastructure and protocol politics</p> <p>Anthropology of Technology</p> <p>IETF culture</p> <p>Human rights advocacy in Internet</p> <p>Turn to the infrastructure</p>

Appendix II: Information Sheet for Potential Interviewees

Study Title

Changing Minds and Machines: A Case Study of Human Rights Advocacy in the Internet Engineering Task Force (IETF)

Invitation

I would like to learn about your experiences of being involved in the IETF processes to develop human rights policies. The following information is for helping you decide whether this is something you would be willing to do, please read it carefully. And please do ask if there are any aspects of the project that are unclear or if you would like more information about it before deciding whether you would like to take part in this research. If you have any questions, please contact Corinne Cath, the author of this study.

What is the purpose of the study?

This study aims to fill a gap in current knowledge about the intersection between Internet governance, Internet standards design, and human rights. To fill this gap, the study will collect interviews from 30–60 experts closely involved in the debate about human rights in the IETF. By using these interviews alongside analysis of IETF working groups covering human rights, this project hopes to create a more in-depth understanding of changes in the approach of the IETF towards human rights and politics, thereby adding to the larger body of knowledge on Internet governance, and the role of civil society within it.

Why have I been invited?

You have been invited because you:

- 1.) Have expressed opinions about the work of the Human Rights Protocol Considerations group (HRPC) group of the Internet Research Task Force (IRTF) or otherwise engaged in human rights discussions in the IETF.
- 2.) Work in the IETF, in work that can touch upon human rights, but have not explicitly worked with the group mentioned above.
- 3.) You were recommended by another interviewee as doing relevant and related work.

Do I have to participate?

Participation is entirely voluntary. There is no obligation to partake. You are welcome to ask follow-up questions about the research and participate without being named. You can withdraw from the research process at any time without giving the researcher a specific reason.

What will I have to do?

If you would like to participate in the study, I will get in touch to set up a time to talk, in person, via Skype or a secure VoIP of your choice at a time convenient to you. In order, not to miss any

information, if you permit it, I will record the conversation, which will last between 45–60 minutes. Everything you say will be kept confidential and your contribution will be anonymised. You can decide which questions you are willing to answer. Before the interview, you will receive a consent form per email.

What will happen to the results of this research?

If you agree to participate in this project, the research will be written up as a doctoral thesis, for the DPhil program in Information, Communication and the Social Sciences at the University of Oxford's Oxford Internet Institute (OII). All participants can request a summary of the research findings should they wish to, by contacting the researcher. On successful submission of the thesis, it will be deposited both in print and online at the University of Oxford, to facilitate its use in future research. The digital online copy of the thesis will be deposited with the Oxford University Research Archive (ORA) and will be published with open access, meaning that it will be available to all Internet users.

I will change all the names and details of everyone I speak to, so no one apart from the researcher you speak to will know who took part in the study or what they said unless the participants explicitly waiver this. All the data will be stored securely on a password-protected computer, where possible with the use of encryption software. The interviewees will be given the opportunity to see the research before publication. Once the analysis is completed, the data will be deleted. Until such time, all data will be held in accordance with the 1998 UK Data Protection Act.

Will the research be published?

The University of Oxford is committed to the dissemination of its research for the benefit of society and the economy and, in support of this commitment, has established an online archive of research materials. This archive includes digital copies of student theses successfully submitted as part of a University of Oxford postgraduate degree programme. Holding the archive online gives easy access for researchers to the full text of freely available theses, thereby increasing the likely impact and use of that research.

If you agree to participate in this project, the research will be written up as a doctoral thesis (see above). Some results may be reported before final publication, at academic conferences and/or published in academic journals but you will not be identifiable from these outputs. If you wish to obtain a copy of the published results, please let the researcher know and she will send you copies as and when she writes them.

What are the risks and benefits?

There are no direct risks associated with participating in this research. The interviewees might want their contribution to be anonymised to ensure strategic considerations and decisions cannot be traced back to any one organisation or individual. Participants are always free to end an interview or cancel it as they see fit.

The benefits of participating in this research are that it allows the interviewees to share their knowledge and experience and put it towards the greater academic goal of knowledge regarding the role and impact of human rights advocacy in Internet governance.

Furthermore, the outcomes of this research will help to improve understanding and application of human rights regimes to Internet infrastructure companies. It will also foster deeper relationships with the research community in general, and the University of Oxford in particular.

Complaints:

If you have a concern about any aspect of this project, please speak to the researcher (contact details below) who will do her best to answer your query. The researcher should acknowledge your concern within 10 working days and give you an indication of how she intends to deal with it. If you remain unhappy or wish to make a formal complaint, please contact:

1. Chair, Medical Sciences Inter-Divisional Research Ethics Committee; Email: ethics@medsci.ox.ac.uk; Address: Research Services, University of Oxford, Wellington Square, Oxford OX1 2JD

2. Chair, Social Sciences & Humanities Inter-Divisional Research Ethics Committee; Email: ethics@socsci.ox.ac.uk; Address: Research Services, University of Oxford, Wellington Square, Oxford OX1 2JD

The chair will seek to resolve the matter in a reasonably expeditious manner.

Who is organising and funding this research?

The research is organised and funded by the University of Oxford and the Alan Turing Institute.

Who has reviewed this research?

This project has been reviewed by, and received ethics clearance through, the University of Oxford's Central University Research Ethics Committee (CUREC) and research supervisors Prof. Victoria Nash and Prof. Gina Neff.

Contact for Further Information or Follow-up

If you have any further questions about this research, please feel free to contact Corinne Cath at ccath@turing.ac.uk

Should you have any questions, comments, or further information, your inquiries are most welcome at any time.

THANK YOU FOR TAKING THE TIME TO READ THIS INFORMATION

Appendix III: Research Prompts for Interviews

Introduction Questions:

1. How long have you been working in the IETF?
2. What areas do you work on?
3. Where do you currently work?
4. Which organisations have you worked for in the past?
5. What is your favourite RFC and why?

IETF and Human Rights

1. How did you become engaged in the IETF/IRTF human rights work?
2. Why did you become engaged in this work?
3. Do you think the IETF should be working on human rights considerations?
4. What impact do you think this human rights work has?
5. Do you think the human rights considerations developed in the IETF work?
6. Are there any aspects of this work that concern you, if so which?
7. Where do you see this human rights work going in the foreseeable future?
8. What outcome would you like to see?
9. During discussion “XX” in IETF meeting “YY”, the topic of human rights came up in working group “Foo-bar”, what did you think of that?

IETF Culture and infrastructural politics

1. What does it mean to believe in ‘rough consensus and running code’?
2. Has the way the IETF works shifted since you started participating, if so how?
3. Has the technology that the IETF develops changed, if so how?
4. What has been the main driver of these changes?
5. What drives standard making?
6. What are the biggest issues facing the IETF right now?
7. What are you concerned about with regards to these developments and (new) actors?
8. What does it mean to say the ‘IETF is not the protocol police’?
9. What does it mean to participate on ‘your individual title’?
10. What do you prioritise when designing standards?
11. How does your professional affiliation impact your priorities?
12. What aspects of standards are important to you and why?
13. How do you describe the IETF to outsiders or to your family?

Closing down:

1. Is there anything you would like to add or something I haven’t asked you?
2. Is there anything you had expected us to discuss that we have not?
3. What RFCs do you recommend I read for my research?
4. Who else should I talk to?
5. What working group are you heading to after our conversation?