Agency for All, Privacy for None

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In the approximately 20 years I have now spent online, the internet has changed rapidly and rather unpredictably. In the early 2000s, as a teenager, I ventured my first steps on the now ancient dial-up internet. I'd connect my 56K modem, hear the magical tones while dialing my ISP telephone number, and suddenly open new gates to exploration. Perhaps attracted by its aesthetics, I gravitated towards a world of hacking which was then far from today's multi-billion-dollar cybersecurity industry. Learning about hacking led me to discover Linux and the free software movement.

At the time, the speed of my dial-up line was so slow and horribly costly. Every minute of navigation costed as much as a minute-long local area phone call. Downloading the installers for a Linux distribution was not possible. Installation discs were traded in person typically at events by Linux User Groups (LUG) and local user collectives, which at the time were numerous throughout Italy, my home country. Alternatively, you could send money to the developers of your favorite distribution, who would then ship branded floppy disks or CD-ROMs back to you, typically from the United States. However, few of us could afford it and those discs became sought-after collectibles.

Back then, Linux distributions were rough around the edges, to say the least. Obtaining, compiling, installing and using any software was a challenge. But the struggle to get the computer to run was

also exhilarating and empowering. Figuring out how to get my US Robotics 56K dial-up modem to work on my Slackware Linux2 (Wikipedia 2021) felt like a remarkable achievement. Ultimately, I could celebrate my successes, and seek help with my failures, on the message boards and online chatrooms.

The difficulty to access this technology and its steep learning curve, coupled with the scarce documentation online, inevitably brought people together to learn from each other. The rebellious act of non-conforming to the computing hegemony of Microsoft Windows became a binding force which gave strength to the growing free software movement. My teenage self was definitely not conscious of this, as I perhaps saw the free software community more as a place of aggregation and acceptance, but I too was practicing some rudimentary form of technological sovereignty. In a time when Microsoft's then CEO, Steven Ballmer, called Linux "a cancer" (Greene 2018), proprietary software was oppressive, Microsoft was evil, and free software was liberating. Music to the ears of a teenage computer geek thirsty for some juvenile rebellion. Soon enough nicknames from the chatrooms became my friends. Together we would crash technology fairs to drop Linux stickers and installation disks at the Microsoft booth. Some early days goliardic digital activism.

There and then, reclaiming agency over our personal computers and rejecting the status quo with the software we used were the baby steps in an ongoing practice of technological sovereignty, which I exercise to this day. However, the evolving nature of technology is reflected in the generational mutations of the struggle for its sovereignty. And in 2020 technology looks very different than in the year 2000.

The Microsoft empire built with the hefty licenses for Windows and Office nearly capitulated to the impetus of the "Cloud" brought by Google and Facebook, and later the whole constellation of Silicon Valley companies. Today, software is no longer the product: all our computing needs are met with an online service provided to us for free (as in "gratis"). The technology industry mutated in an Orwellian offspring of the advertising industry, where free online services are the hook, we are the product, and our data is the commodity of trade.

In 2020, we consume everything through a browser; so much so that Google realized that if a browser is all we need, they might as well

create an operating system[1] around their flagship browser, Chrome, and produce lightweight and cheap laptops, Chromebooks, with the original single purpose of just navigating the Web. Chromebooks are now very popular in schools (Gebhart 2018), and young users grow up within the gates of a digital amusement park run by the corporate giant from Mountain View. Google wants you to spend as much time in it as possible: use Android phones or a Chromebook computer, use Chrome as your browser, use your Google Account to access Google Search, Google Mail, Google Drive, Google Maps and YouTube. They even tried with Google+ and Google Orkut before realizing they are just not good at social networks. The more Google attractions available, the more you'll stick around the amusement park, the more data you will generate for harvest.

Although Google managed to turn its brand into a synonym verb for "search on the internet," Facebook has, even more ambitiously, aimed to become synonym with "internet" itself. Through an initiative aptly named "internet.org," Facebook provides free-of-charge access to its social network and a few other selected websites in underserved regions of the world by partnering with telecommunications providers and researching technologies "including high-altitude long-endurance planes, satellites and lasers" (Internet.org 2020). And while many critics have called it out as digital colonialism (Shearlaw 2016) and an affront to net neutrality, for tens of millions of people Facebook is the internet.

Silicon Valley is a mining quarry in disguise. Our data is the raw material of a new extractivist trillion-dollar industry, which, instead of selling coal, sells our digital selves. Therefore, our struggle for technological sovereignty has turned more digital and requires us to not only reclaim agency over our electronic devices but to reclaim ownership of our electronic information.

In this era of Surveillance Capitalism, as Shoshana Zuboff (2020) describes it, the idealism and enthusiasm of my teenage free software years are long gone. Because standalone software no longer produces huge profits, Big Tech companies began espousing open source (Schrape 2016). As a matter of fact, before the abusive nature of its advertising-based business model became apparent in recent years (Amnesty International 2020), Google successfully built its

1 Google Chrome OS, https://www.google.com/chromebook/chrome-os/.

image of a progressive company and attracted talent and users also by becoming a promoter of open source, in stark contrast to the old technological behemoths like Microsoft. However, by appropriating it as corporate culture,[2] Google has helped industrialize open source while alienating its political elements step-by-step, and distilling out the essence of free (as in "freedom") software. Eventually even Microsoft caught up to the change and has become an important promoter of this watered-down open source. Some even see in open source an alternative to the United States' technological trade war with China (Xu 2020).

These days, Big Tech companies release more open source code than ever (Bridgwater 2019), but make no mistake: This is a calculated choice. As we established, data fuels today's tech industry, not software, despite its industrious production. Companies like Google and Facebook eventually realized that by providing open source tools and libraries and free services to the ever growing global population of developers, they can ensure the developers' dependency on their platforms while also extending their data gathering to third-party products and services.

Google funds thousands of open source developers through its yearly Summer of Code,[3] open-sourced Android, releases countless tools and libraries, and has even provided developers free services to facilitate their work. Similarly, Facebook provides open source Software Development Kits (SDKs)[4] for Android, iOS and even Apple TV and PC games, for developers to conveniently allow their users to authenticate over Facebook.

If you are a developer today, you're provided with free access to a technology stack that in the past only big software houses could afford. In return, of course, Big Tech companies expect to harvest data on your users, too. You become part of the scheme, and if you wish, you can get in on it and embed their advertising platforms in your apps and websites so you too can monetize. In other words, open source became a means to further Big Tech's reach into users' data. Ka-ching!

2 Cf. Google Open Source, https://opensource.google.

3 Google Summer of Code, https://summerofcode.withgoogle.com.

4 Google AdMob, https://admob.google.com/home/.

While free software remains an important framework of values, particularly for new tech-savvy generations, seeking in it answers to the question of technological sovereignty today is outdated, almost vintage. Reclaiming agency over our digital selves requires resisting data extractivism, but its ubiquity and societal dependency make just that very hard. Not only do alternatives typically have a cost, but giving up on certain platforms might also mean giving up on personal and professional opportunities. Twitter became the shop window of your personal brand, Facebook the marketplace of your services, and in the arts and performance sectors Instagram even became a metric of value: the number of followers might dictate the price tags of your artworks or your placement in a festival's schedule.

Because data extractivist platforms became so inescapable, technological sovereignty requires sacrifice: You need to strike a balance between personal freedoms and opportunities. Casting yourself out of these digital amusement parks can turn you into a technological hermit, unseen and worthless in today's attention economy; nearly comparable to the 20th century primitivists who rejected the advent of computers. However, you can determine which platforms are beneficial to your objectives and avoid volunteering an opulence of data to those platforms you don't need: Reduce your data footprint just like you reduce your carbon footprint.

However, our strive to regain control of our data starts with the understanding of where it generates and how it travels. But, the ever-increasing complexity of modern technology complicates this.

The smartphone revolution put pocket computers in the hands of billions of people, and every new generation packs ever more functionality in these palm-sized circuitries. You can call, message, navigate, work, play, record media and do anything the countless number of available apps allow you to do. Smartphones keep pushing the envelope of technological complexity. Their internals are hardly comprehensible to regular consumers, and nevertheless we embraced them as electronic extensions of our biological selves.

Much of my work focuses on exposing the invisible nature of modern technology, and smartphones eventually piqued my interest: How are we to reclaim digital sovereignty while hardly understanding the functioning of the most personal devices we carry? In a work called RADIO ATLAS (Guarnieri 2020b), I attempted to visualize, provide a cartography of the surrounding radio entities, seeking to

discover what our mobile devices are transmitting unbeknownst to us. Through multiple computers, RADIO ATLAS continuously probes radio frequencies occupied by Wi-Fi, Bluetooth and mobile networks. Turns out, radio frequencies are an extremely crowded space. Our smartphones continuously emit our phones' identifiers over GSM, they advertise their presence over Bluetooth, and look for familiar Wi-Fi names by broadcasting them into the ether. In silence, they constantly transmit data, and allow us to be tracked. Rather unexpectedly, this exploration of smartphones' transmissions and tracking capabilities became ever more timely with the COVID-19 pandemic.

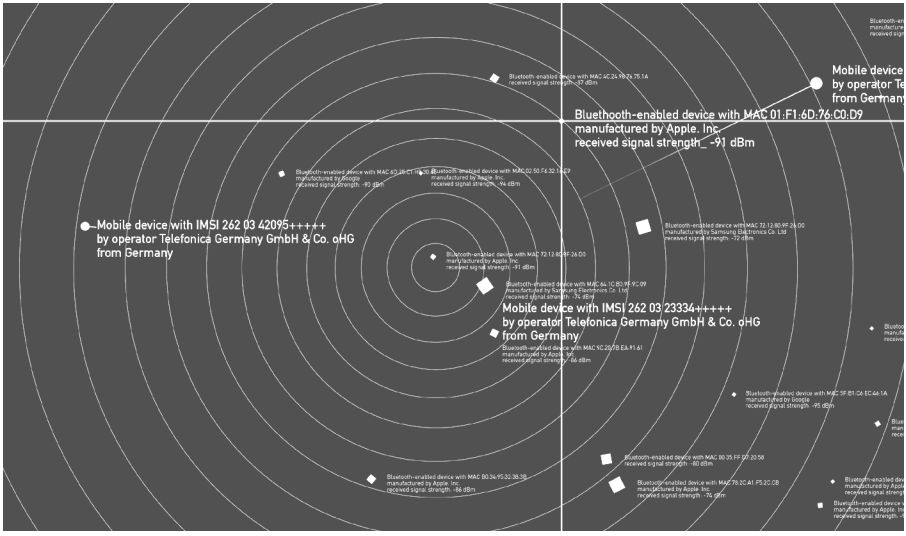

Fig. 1

The eruption of the pandemic propelled the idea of digitized contact tracing (Guarnieri 2020c) to the top of all governments' political agendas. While early on, some proposed tracking everyone's GPS coordinates through their smartphones, national health authorities, particularly in Europe, eventually gravitated towards Bluetooth-based contact tracing and by now many have rolled out apps. Through Bluetooth low energy (BLE) transmissions, smartphones continuously broadcast a computed identifier while keeping records of those received by other devices in the surroundings. Because we all carry our smartphones everywhere and because Bluetooth transmits within a range of a few

meters, sufficient for approximating a close distance between devices, it all made sense. By attempting to digitize human contact, these apps aim to facilitate the process of identifying potential spread of the virus by reconstructing the social interactions of diagnosed patients.

In an unprecedented collaboration, Apple and Google teamed up to launch a self-titled "Exposure Notification"[5] framework upon which national health authorities could build their COVID-19 contact tracing apps. By combining strong cryptography and the use of BLE beacons, Apple and Google anticipated likely inevitable regulations and made available an architecture more respectful of people's privacy, at least compared to the intrusive alternatives put forward by some governments.

Anticipating the availability of apps built on the Exposure Notification framework, expanding the concept of RADIO ATLAS, I built BLE ATLAS as an attempt to explore BLE by visualizing in real-time beacons received by a sensor I was running. This project was both an experiment as well as a digital artwork. It was an attempt at analyzing Bluetooth surroundings, exposing the unexpected amount of transmissions and scrutinizing inconsistencies in the light of the inevitable surge of use. At the same time, BLE ATLAS (Guarnieri 2020) attempted to subvert the supposed locality of these transmissions, and betray their expected ephemerality by willfully live-streaming them online.

Similarly to RADIO ATLAS, BLE ATLAS quickly highlighted the flood of data transmissions by nearby mobile devices, which even overwhelmed my sensor and forced me to add filters in order to visualize them intelligibly.

The race to deploy contact tracing apps created tensions between governments and Apple and Google. Because of limitations in Android and iOS, the former found themselves cornered by having to embrace the architecture designed by the latter, which enforced strict privacy and security policies, at times contradicting the ambitions of some national health authorities (Hern 2020). Although, admittedly, the Exposure Notification framework safeguards users' data much better than how many governments had planned to, it challenged digital sovereignty as several European officials pushed back (Clarke

5 Google COVID-19 Exposure Notifications, https://www.google.com/covid19/exposurenotifications/.

2020) on Silicon Valley's supremacy in determining how countries should respond to COVID-19. The fast-paced rollout of Exposure Notification apps fueled a fervent debate on these companies' incentives and interests. And although Apple and Google do not secretly siphon private health data through their framework, contrary to widespread misconceptions spread by poor reporting, their spearheading of this unprecedented social and technological experiment raised the suspicion of many citizens wondering if their own governments have abdicated to Big Tech. The pandemic heightened the clash between global tech monopolies and national governance.

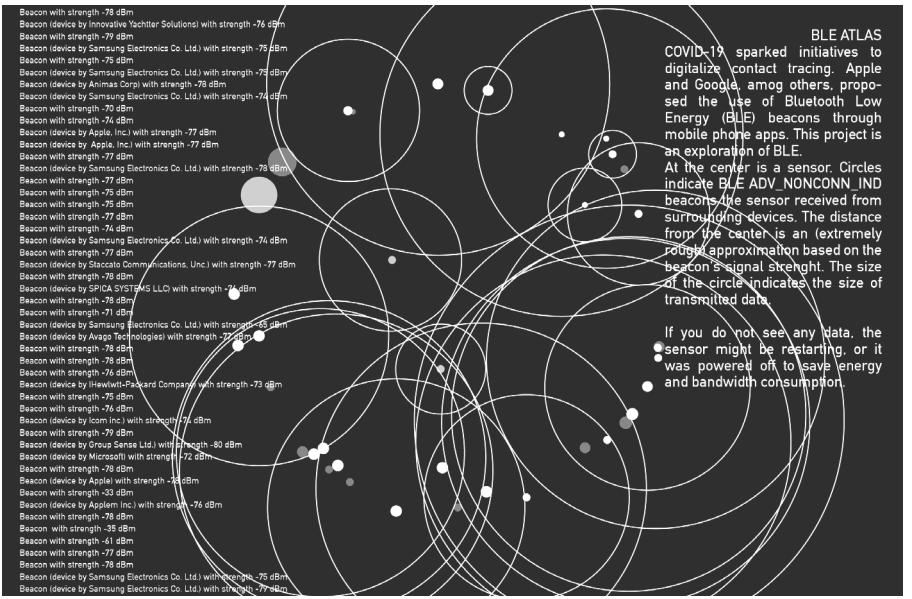

Fig. 2 https://ble-atlas.nex.sx.

These contradictions can only intensify. Over the last few years, prompted by the disinformation and Cambridge Analytica (Wong 2019) scandals of the 2016 election and by antitrust debates, Facebook and Google executives were grilled during US Senate and Congressional hearings. The footage of billionaire Big Tech executives mumbling and fumbling in front of inquiring committees has become iconic of the second half of 2010s. At the same time, we are coming down from the digital high of the early 2010s, and the veil of wonder around Silicon Valley is coming off – to reveal a dystopian nature. Big Tech continues to govern modern social contracts, but we are starting to grasp the effects of its exploitative business. The 2020s could be the decade of reckoning.

While European Union officials try to reclaim digital sovereignty through regulations and investments, the rest of us are left navigating the conflict between privacy and convenience. The surfacing nature of today's corporate internet and the impenetrable complexity of the technology pervading our daily lives are requiring us to re-think our approach to digitization and rediscover the need for a deep tech literacy. At the crossroads between agency for all and privacy for none, the fight for digital sovereignty rages on. How this fight will play out lies in the hands of the highly digitized new generations who got online through Facebook and Instagram, and who are deeply rooted in this hypersharing world. Those of us who got online with the eerie tones of dial-up modems instead shall be aging observers. Some torn by a maybe cynical worry for a youth seemingly addicted to these platforms, some instead hopeful in a youth much more technologically advanced and showing great strength in other important battles such as gun control, the basic right to education and climate change.

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