Using Technology to Solve Problems of Policy: The Case of Urbit

Andrea O'Sullivan

Technology policy, particularly that which considers third-party platforms, was something of a niche pursuit for much of the early millennium. Intellectual property considerations briefly punctuated the public consciousness with the rise of file-sharing platforms such as Napster in the early 2000s.[1] Other than that, most people thought very little of the laws and norms that govern the internet.

This includes technology companies themselves, many of which did not even have much of a dedicated policy operation until relatively recently. When I arrived in Washington, DC in 2011, the total number of dedicated technology policy staffers employed by large technology outfits could probably be counted in the dozens.

Companies like Google and Facebook were famously disdainful of politicking and lobbying,[2] preferring instead to mostly ignore Washington. Amazon only spent some $3 million on lobbying in 2013;[3] today, it is closer to $20 million.[4] This is before even getting into the rich ecosystem of nonprofits and educational ventures that these companies support to encourage debate around these issues[5]—to say nothing of the many mirror groups founded to attack technology companies.[6]

It was a matter of time. As technology platforms grew in size and influence, government policies were sure to sharpen. These companies understandably want to limit the negative impacts that laws can have on their bottom lines and customer

experiences.

Technology policy has become something of a kitchen table conversation, as well. Most people use some kind of social media platform every day. The policies that these companies (and the governments that govern them) set to control content on their websites has a dramatic effect on people's everyday lives. A simple algorithm change can upend a business's entire marketing strategy. The kinds of content that is promoted or demoted can greatly influence our moods, information diets, and even worldviews. Platforms now have the power to limit the voice of a sitting U.S. president. It is expected that people would talk about these things.

As such, many Americans have strong opinions on topics that were only a few short years ago the domain of a handful of oddball technologists. We live in a world where one's position on Section 230 of the Communications Decency Act can mark them as a populist hero or an establishment holdout. This has brought a blurring of the finer contours of the policy discussion. Being "against Section 230" is shorthand for being "against Big Tech," regardless of whether or not that position would help Big Tech about as much as it would hurt non-mainstream voices.

The issues that underlie such sloganeering are very well founded. The design of technology is of great import for user sovereignty.[7] Centralized platforms imply centralized control of content, data, and even behavior. So far, most of the conversation has focused on higher level laws to influence those technological controls. Alas, the effort needed to change these laws is great, and it is not clear that simple-seeming

remedies such as "repealing Section 230" would bring about the ends intended by activists.

The good news is technological alternatives exist that attack the problem at the root. These projects seek to rewrite how computers communicate so that users are endowed with more sovereignty by design.[8]

This sounds ambitious, and it is. But these are not merely theoretical pursuits. One of the boldest projects to redesign online networking from scratch exists and works today.

Urbit is a strong case study in the possible future of decentralized general-purpose computing.[9] While other projects have valiantly sought to innovate around established computing paradigms, most notably by creating more decentralized protocols such as the Fediverse ecosystem, they usually keep the established server-client model of networking intact.

The thesis of Urbit is that it is precisely the Unix-based server-client system that encourages economies of scale towards cloud computing and therefore industrial-scale data centers and third-party controlled platforms and services.[10] Urbit provides a from-scratch deterministic operating system (OS) and networking architecture that allows each computer to serve as its own personal server.[11]

Let's break that down.

The roots of our contemporary computing experience sprung forth from the fertile grounds of Bell Labs, which partnered with the minds at General Electric and the Massachusetts Institute of Technology in 1969 to develop a time-sharing OS that would allow multiple users to access a mainframe at the same time.[12] The Multiplexed Information

and Computing System (Multics) that resulted eventually gave way to the Uniplexed Information Computing Service, a backronym play on words typical of computer scientists to sound like "eunuchs," or "Unix."[13] Unix was unveiled to the public at the 1973 Association of Computing Machinery symposium[14] and quickly became popular for its introduction of multi-user access as well as hierarchical file system management, asynchronous processing, portability from being written in a high-level language called C, and built-in networking capabilities.[15]

This system was a paradigm shift in how computers could talk to each other. Developers could now easily collaborate on building computer programs. The client-server model that separates information providers (servers) and requesters (clients) married the Unix programming environment to afford a more decentralized computer experience. Unix spread in popularity among academic and research communities through new versions such as Berkeley Software Distribution (BSD) and Linux, before eventually becoming a standard of commercial offerings for the broader public, such as Apple's Mac OS X.

This commercialization, and the general process of onboarding the public into networked computing, implies great scale. Expert computer users at well-capitalized institutions can run a server the way they want much more easily than someone like me. Today, motivated hobbyists can likewise run their own servers for things like email and media, but it is not too common.

Mostly, people outsource such operations to third parties. This is part of why companies like Meta, Alphabet, Microsoft, and Apple have grown so successful. It is too complicated for most people to run their own music server that their devices (clients) can access. Rather, they purchase a subscription with Apple Music or YouTube Music that streams it over the internet. We don't set up servers with our photos and videos that we can share to the world. We post them to our Facebook and Instagram pages for our friends and family to see. Most of us don't even really set up our own webpages anymore where we could rant to the world about whatever political topic we want. We have third-party hosted websites managed through third-party run publishing platforms and perhaps monetized through third-party payment services. Each of these third parties affords one more lever of control by which we can potentially be deplatformed.

Some projects aim to route around deplatforming by building tools to make it easier or clearer to run one's own server to access a service.[16] This is the model of projects like Mastodon, Matrix, and XMPP.[17] Users can opt to run their own server to host chat and media, or use a third-party server, like a friend's, or use one provided by the service itself. Servers can choose which users and other servers to connect with or blacklist. This allows some degree of private moderation and dispute resolution within the service community.

However, it is unrealistic to expect most people to "be their own servers" in the dominant computing environment as a response to the deplatforming problem. It is for this reason that many alternatives to large tech platforms struggle to find a user base. It is

simply not easy or intuitive to use these alternatives. The payoff is unclear and all of their friends are on large platforms anyway. Why go through the hassle of setting up a server for a network that very few people will use?

This is where Urbit comes in. Its founder, computer programmer and homebrew political theorist,[18] Curtis G. Yarvin, has characterized the project as the way one might build a networking environment if we were to start from scratch today. An early internet adopter himself, Yarvin believes that the Unix and HTTP-based internet served well the needs of the 100,000 or so sophisticated academics and researchers that constituted the initial user base. But it "doesn't scale for human beings."[19]

The Urbit platform is a personal server and clean-slate decentralized software stack. It consists of an operating function, Nock, and functional language, Hoon, that allow one's Urbit to "think." On top of these are built the operating system, Arvo, and a few in-built features: an encrypted p2p network, typed revision control system, functional build system, application sandbox, and a vault for personal files. It is a complete OS and networking environment written in 30,000 lines of code.

Crucially, your Urbit essentially condenses client and server into one unit. Each Urbit is its own server which can interact directly with any other Urbit. This is baked into the code; users don't need to go out of their way to set up and maintain private servers for whatever needs they have. Someone like me can behave as if we were

sophisticated system administrators merely by booting up our Urbit.

Many benefits follow. For starters, this design affords user sovereignty. Individuals are no longer at the whim of one of a handful of large companies that set one-size-fits-all policies that may be arbitrarily enforced to incentivize mostly bland, commercially friendly, or politically correct content. Data privacy issues are also addressed, as large entities no longer control mega datasets of personal data that can be leaked or cut off from users. If you don't like the policies of another Urbit, you can simply choose to not associate with them (and vice versa). Furthermore, if another Urbit decides to not associate with you, they cannot cut you off from your own data in removing their association, as is the case when a user is deplatformed by a third party and can no longer access their content and contacts from that account.

This does not imply anarchy. The flip side of a lax moderation policy is usually that filthy content will accrue. On Urbit, there is a cost to poor behavior. There are a limited number of Urbits that are usually costly to acquire. Some rarer kinds of Urbits have authentication and routing duties: these are galaxies (255 total) and stars (65,000 total). Then there are planets (4 billion total) and moons (4.3 trillion total), which can access and use the Urbit network. Each of these Urbits comes with a persistent public identity. If a user engages in trolling, criminal activity, or abuse, they will be identified and ostracized. Furthermore, they will incur a financial loss, as their reputation will be ruined. This is how content moderation problems can be addressed without ill-fitting

and abusable corporate or government interventions.

Urbit is a virtual machine for distributed environments. It is like a browser that allows one to interact directly with other computers. As Bitcoin made it possible for individuals to send value directly to each other, Urbit makes it possible for computers to interface directly.

One can find many critiques of Urbit online. It is an ambitious project; some believe it is too ambitious.[20] Every few years, a new project will spring forth to "rebuild the internet." Much of the web3 hype leverages this perennial quest.[21] There are many technical debates over the merits of some of the design choices. Aesthetically, Urbit is unique even when compared to other functional programming environments.[22] (It is very likely your eyes glazed over as I described the system design.) Yarvin describes the project as "programming for Martians": the way an alien civilization might design their networking infrastructure.[23] Critics maintain this will keep interested developers away. Ideologically, some opponents dislike the founder's right-leaning politics.[24]

What cannot be said is that Urbit does not work. It exists, functions, and maintains a small but dedicated user base. Many ventures have launched on Urbit, such as Tirrel, Uqbar, Wexpert Systems, Third-Earth, dcSpark, and Holium—my husband is employed full time as an Urbit developer and has worked with many of these groups. Building on Urbit is a holistic endeavor; as with Unix in the late 1970s, the environment is built in a way so that a developer like my husband has most everything he needs within the Urbit ecosystem. And as

with Unix, if this endeavor does take off, it could reshape computing for years to come.

It is more likely that it will fail. This essay does not argue that this particular project will be the one to solve the problems that technology policy attempts to remediate—although I certainly hope it does. Rather, the point is that technology can be a more potent tool to address problems than policy.

Bitcoin is an example of a technology that solved many longstanding problems surrounding monetary policy, financial surveillance, and individual sovereignty. Attempting to tackle these through law would have taken significant time and re-sources for an uncertain, if even possible, payoff. Technology solved these at once without permission or apology.

Policymakers and shapers interested in securing more sovereignty online would do well to educate themselves and perhaps use and support the kinds of projects that seek to achieve their ends. Urbit is a good example of a promising project to decen-tralize the internet. But as mentioned, not all projects which claim to do this actually *do*—there are many scams and vaporware as well.

The futurist Buckminster Fuller fa-mously stated: "You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete." There is val-ue in fighting bad laws in policy. But many underrate the value of building such new models that make these fights irrelevant. Urbit is one attempt to do that.

Andrea O'Sullivan is a technology pol-icy scholar and prior Director of Tech and Innovation Center at The James Madison Institute.

REFERENCES

1   Tom McCourt and Patrick Burkart, "When Creators, Corporations and Consumers Collide: Napster and the Development of On-line Music Distribution," *Media, Culture & Society*, Vol. 25, No. 3 (2003): pages 333-350, https://journals.sagepub.com/doi/abs/10.1177/0163443703025003003.

2   Tom Hamburger and Matea Gold, "Google, once disdainful of lobbying, now a master of Washington influence," *Washington Post*, April 12, 2014, https://www.washingtonpost.com/politics/how-google-is-transforming-power-and-politicsgoogle-once-disdainful-of-lobbying-now-a-master-of-washington-influence/2014/04/12/51648b92-b4d3-11e3-8cb6-284052554d74_story.html.

3   Rani Molla, "Google, Amazon, and Facebook all spent record amounts last year lobbying the US government," *Vox*, January 23, 2019, https://www.vox.com/2019/1/23/18194328/google-amazon-facebook-lobby-record.

4   Karl Evers-Hillstrom, "Amazon, Meta report record lobbying spending in 2021," *The Hill*, https://thehill.com/business-a-lobbying/business-a-lobbying/590788-amazon-meta-report-record-2021-lobbying-spending/.

5   Danny Vinik, "Inside the new battle against Google," *Politico*, September 17, 2017, https://www.politico.com/agenda/story/2017/09/17/open-markets-google-antitrust-barry-lynn-000523/.

6   David McCabe, "America's Top Foundations Bankroll Attack on Big Tech," *New York Times*, December 10, 2019, https://www.nytimes.com/2019/12/10/technology/americas-top-foundations-bankroll-attack-on-big-tech.html.

7   Andrea O'Sullivan, "Deplatforming and Freedom: A Primer for Policy," *James Madison Institute*, March 2021, https://www.jamesmadison.org/wp-content/uploads/2021/04/PolicyBrief_Deplatforming_Mar2021_v02.pdf.

8   Andrea O'Sullivan, "Route Around Deplatforming With Decentralized Tech," American Conservative, March 11, 2021, https://www.theamericanconservative.com/route-around-deplatforming-with-decentralized-tech/.

9   Curtis Yarvin, Philip Monk, Anton Dyudin, and Raymond Pasco, "Urbit: A Solid-State Interpreter," White Paper, May 26, 2016, https://media.urbit.org/whitepaper.pdf.

10 "What is Urbit?" Urbit YouTube Channel, January 14, 2019, https://www.youtube.com/watch?v=M04AKTCDavc.

11 ~timluc-miptev, "What Urbit Is," https://blog.timlucmiptev.space/whaturbitis.html.

12 David Fiedler, "The Unix Tutorial, Part 1: An Introduction to Features and Facilities," *Byte Magazine*, August 1983, pages 186-211, available at Internet Archive: https://archive.org/details/byte-magazine-1983-08/page/n187/mode/2up?view=theater.

13 This was all in the pursuit of a better programming environment to launch video game side projects. See: Dennis M. Ritchie, "Space Travel: Exploring the solar system and the PDP-7," 1998, https://www.bell-labs.com/usr/dmr/www/spacetravel.html

14 Dennis Ritchie and Ken Thompson, "The UNIX time-sharing system," *SOSP '73: Proceedings of the fourth ACM symposium on Operating system principles* (January 1973): https://doi.org/10.1145/800009.808045.

15 Richard Stallman, "new UNIX implementation," net.unix-wizards, September 27, 1983, ironically available at: https://groups.google.com/g/net.unix-wizards/c/8twfRPM79u0/m/1xlglzrWrU0J.

16 Andrea O'Sullivan, "Route Around Deplatforming With Decentralized Tech," American Conservative, March 11, 2021, https://www.theamericanconservative.com/route-around-deplatforming-with-decentralized-tech/.

17 Jay Graber, "Ecosystem Review," Twitter Blue Sky, January 2021, https://matrix.org/_matrix/media/r0/download/twitter.modular.im/981b258141aa0b197804127cd2f7d298757bad20.

18 Jacob Siegel, "The Red-Pill Prince," *Tablet Magazine*, March 30, 2022, https://www.tabletmag.com/sections/news/articles/red-pill-prince-curtis-yarvin.

19 Isaac Simpson, "Urbit and the Not-So-Dark Future of the Internet," *Vandal Press*, April 12, 2017, https://medium.com/vandal-press/urbit-and-the-not-so-dark-future-of-the-internet-400c9b667e2.

20 Francis Tseng, "Who Owns the Stars: The Trouble with Urbit," *Distributed Web of Care*, 2019, http://distributedweb.care/posts/who-owns-the-stars/.

21 Andrea O'Sullivan, "What Is Web3 and Why Is Everyone Suddenly Talking About It?" Reason, November 23, 2021, https://reason.com/2021/11/23/what-is-web3-and-why-is-everyone-suddenly-talking-about-it/.

22 Unlike every other project, in Urbit, 0 is true and 1 is false. *See*: "2d: Bit Logic," Reference/Hoon/Standard Library, accessed July 11, 2022, https://developers.urbit.org/reference/hoon/stdlib/2d.

23 C. Guy Yarvin, "Urbit: functional programming from scratch," *Moron Lab*, http://moronlab.blogspot.com/2010/01/urbit-functional-programming-from.html.

24 Elizabeth Sandifer, "The Strange and Terrifying Ideas of Neoreactionaries," *Current Affairs*, May 30, 2022, https://www.currentaffairs.org/2022/05/the-strange-and-terrifying-ideas-of-neoreactionaries.