The Next Great Internet Disruption: Authority and Governance

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I recently wrote the following essay with John H. Clippinger as part of the ongoing work of ID3, the Institute for Data-Driven Design, which is building a new open source platform for secure digital identity, user-centric control over personal information and data-driven institutions.

As the Internet and digital technologies have proliferated over the past twenty years, incumbent enterprises nearly always resist open network dynamics with fierce determination, a narrow ingenuity and resistance. It arguably started with AOL (vs. the Web and browsers), Lotus Notes (vs. the Web and browsers) and Microsoft MSN (vs. the Web and browsers, Amazon in books and eventually everything) before moving on to the newspaper industry (Craigslist, blogs, news aggregators, podcasts), the music industry (MP3s, streaming, digital sales, video through streaming and YouTube), and telecommunications (VoIP, WiFi). But the inevitable rearguard actions to defend old forms are invariably overwhelmed by the new, network-based ones. The old business models, organizational structures, professional sinecures, cultural norms, etc., ultimately yield to open platforms.

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When we look back on the past twenty years of Internet history, we can more fully appreciate the prescience of David P. Reed's seminal 1999 paper on "Group Forming Networks" (GFNs). [1] "Reed's Law" posits that value in networks increases exponentially as interactions move from a *broadcasting* model that offers "best content" (in which value is described by *n*, the number of consumers) to a network of *peer-to-peer transactions* (where the network's value is based on "most members" and mathematically described by n^2). But by far the most valuable networks are based on those that *facilitate group affiliations*, Reed concluded. When users have tools for "free and responsible association for common purposes," he found, the value of the network soars exponentially to 2^n – a fantastically large number. This is the *Group Forming Network.* Reed predicted that "the dominant value in a typical network tends to shift from one

category to another as the scale of the network increases.…"

What is really interesting about Reed's analysis is that today's world of GFNs, as embodied by Facebook, Twitter, Wikipedia and other Web 2.0 technologies, remains highly rudimentary. It is based on proprietary platforms (as opposed to open source, user-controlled platforms), and therefore provides only limited tools for members of groups to develop trust and confidence in each other. This suggests a huge, unmet opportunity to actualize greater value from open networks. Citing Francis Fukuyama' book *Trust,* Reed points out that "there is a strong correlation between the prosperity of national economies and *social* capital, which [Fukuyama] defines culturally as the ease with which people in a particular culture can form new associations."

A Network Architecture for Group Forming Networks

If we take Reed's analysis of network dynamics seriously, and apply his logic to the contemporary scene, it becomes clear that the best way to unlock enormous stores of value on networks is to develop tools that can facilitate GFNs. This will be the next great Internet disruption. But to achieve this, we must develop a network architecture and software systems that can build trust and social capital in user-centric, scalable ways.

Necessarily, this means that we must begin to re-imagine the very nature of authority and governance. We must invent new types of digital institutions that are capable of administering authority recognized as authentic and use algorithmic tools to craft and enforce "law."

The idea that conventional institutions of governance (and government) may have to change may seem like a far-fetched idea. Who dares to question the venerable system of American government? Traditions are deeply rooted and seemingly rock-solid. But why should government be somehow immune from the same forces that have disrupted Encyclopedia Britannica, retailing in all sectors, the music industry, metropolitan daily newspapers and book publishing? Based on existing trends, we believe the next wave of Internet disruptions is going to re-define the nature of authority and governance. It is going to transform existing institutions of law and create new types of legal institutions – "code as law," as Lawrence Lessig famously put it.

Governance is about legitimate authority making decisions that are respected by members of a given community. These decisions generally allocate rights of access and usage of resources, among other rights and privileges. Such governance generally requires a capacity to assert and validate who we are – to determine our identity in one aspect or another. That's what is happening when the state issues us birth certificates, passports, Social Security numbers and drivers' licenses. It is assigning us identities that come with certain privileges, duties and sanctions. This is the prerogative of institutions of governance – the ability to do things *to you* and *for you.* Institutions set criteria for our entitlements to certain civic, political, economic and cultural benefits. In the case of religious institutions, such authority even extends to the afterlife!

The power to govern is often asserted, but it may or may not be based on authentic social consent. This is an important issue because open networks are changing the nature of legitimate authority and the consent of the governed. User communities are increasingly asserting their own authority, assigning identities to people, and allocating rights and privileges in the manner of any conventional institution. Anonymous, Five Star Movement, the

Pirate Party, Arab Spring, Lulzsec and Occupy are notable examples of such grassroots, network-enabled movements – and there are plenty of other instances in which distributed networks of users work together toward shared goals in loosely coordinated, bottom-up ways. Such "smart mobs" – elementary forms of GFNs – are showing that they have the legitimacy and legal authority and the economic and cultural power to act as "institutions" with a modicum of governance power.

This is where Reed's law and the proliferation of open networks, amplified by the ubiquity of mobile devices is starting to make things very interesting. If the means to facilitate GFNs can be taken to more secure and trusted levels, empowering cooperative action on larger scales, it opens up a vast new realm of opportunity for value-creation above and beyond Web 2.0 platforms.

This vision is especially attractive in light of the structural limitations of large, centralized institutions of government and commerce. By virtue of their (antiquated) design, they simply are not capable of solving the challenges we are demanding of them. Conventional legislation, regulations and litigation are simply too crude and unresponsive to provide governance that is seen as legitimate and responsive. As for social networking platforms, they typically rely upon proprietary business models that collect and sell personal information about users, which is exposing another sort of structural barrier: social distrust. Businesses based on such revenue-models cannot help but stifle the GFN potential described by Reed's Law.

Group Forming Networks and Big Data

The promise of self-organized network governance – a new type of Group Forming Network – holds a great deal of appeal when it comes to Big Data. We now live in a world of ubiquitous digital networks and databases that contain vast amounts of personal information about individuals. GFNs could help us overcome the legal and regulatory impasse that we now face with respect to the management of such personal data. Neither Congress, executive agencies or the courts are likely to come up with a set of responsive policies that can keep pace with technological innovation and thwart players of ill-intent.

Ever since Hobbes proposed the State as the only viable alternative to the dread state of nature, citizens have entered into a notional "social contract" with "the Leviathan" to protect their safety and basic rights. But if networked technologies could enable individuals to negotiate their own social contract(s) and meet their needs more directly and responsively, it would enable the emergence of new sorts of effective, quasi-autonomous governance and self-provisioning. And it could achieve these goals without necessarily or directly requiring government. Online communities working in well-designed software environments could act more rapidly, with highly specific knowledge and with greater social legitimacy than conventional government institutions. Users, acting individually and in groups, could use their own secure digital identities to manage their own personal information.

This scenario is inspired not just by David Reed's analysis of how to reap value from networks, but by the extensive scholarship of Professor Elinor Ostrom, the Nobel Laureate in economics in 2009. Ostrom identified key principles by which self-organized groups can manage common-pool resources in fair, sustainable ways. If data were to be regarded as a common-pool resource, Ostrom's research shows how it would be possible for online groups to devise

their own *data commons* to manage their personal data in their own interests.

Of course, "law" emerging from self-organized digital institutions would have a very different character than the kinds of law emanating from Congress and the Supreme Court (just as blogging is a different from journalism and Wikipedia is different from Encyclopedia Britannica). "Digital law" would be algorithmic in the sense that machine-learning would help formulate and administer the law and enforce compliance. It would enable users to devise new types of legal contracts that are computationally expressible and executable, as well as evolvable and auditable. Such an innovation would make institutional corruption and insider collusion far easier to detect and eliminate. Arcane systems of law – once based on oral traditions and printed texts – could make the great leap to computable code, providing powerful new platforms for governance. Law that is dynamic, evolvable and outcome-oriented would make the art of governance subject to the iterative innovations of Moore's Law. Designs could be experimentally tested, evaluated by actual outcomes, and made into better iterations.

Open Mustard Seed

Mindful of the functional limits of conventional government and policymaking – and of the unmet promise of Reed's Law despite the ubiquity of the Internet – it is time to take fuller advantage of the versatile value-generating capacities of open network platforms. It is time to develop new sorts of network-native institutions of law and governance.

That is the frank ambition of a new collaboration between Institute for Data-Driven Design (ID3), a tech nonprofit based in Boston, Massachusetts, headed by Dr. John H. Clippinger, and the M.I.T. Media Lab's Human Dynamics Group, led by Professor Alex "Sandy" Pentland. Working with a range of partners, the ID3/MIT team is developing a new software platform, Open Mustard Seed (OMS), that seeks to enable users to build new sorts of decentralized, dynamically responsive and transparent digital institutions. By enabling people to build trust and cooperation among each other, Open Mustard Seed seeks to fulfill the promise of Reed's Law.

Soon to be available as an alpha-release, OMS will provide a new infrastructure to let people build their own highly distributed social ecosystems for reliably governing all sorts of shared resources, including their personal data. The software is a synthesis of a variety of existing software systems – for digital identity, security, computable legal contracts and data-management – designed to serve as a new platform for social exchange and online governance. Just as the original html code gave rise to the World Wide Web and new types of bottom-up social communication and collaboration, OMS can be conceived as a new "social stack" of protocols and software for self-organized governance. Instead of looking to (unreliable, unwieldy) external institutions of law and policy, OMS uses software code to *internalize governance* to individuals and online communities.

OMS solves a number of interrelated problems about Big Data. Users have not had an easy or reliable means to express their preferences for how their personal data may be accessed and used, especially when one context (a bank) differs so much from another (a healthcare provider) and still others (family and friends). A user may not know with whom they are really transacting, nor can they readily verify that their privacy preferences are

actually respected and enforced. Users are often wary of exposing or sharing their data with third parties whose trustworthiness is not known. In this context, it is not surprisingly that protecting one's personal information is seen as antithetical to commercial and governmental uses of it.

The Open Mustard Seed project seeks to overcome these problems through a technical architecture called the "Trustworthy Compute Framework" (TCF). The TCF extends the core functionality of "Personal Data Stores" (PDS) – digital repositories in the cloud that let users strictly control their personal information – by enabling online users to interact flexibly with third parties in secure, trustworthy ways. The system architecture uses nested tiers of "trusted compute cells" starting at the "private" level and moving up to portal and group levels. The idea is to enable trusted social relationships and collaboration that can scale. Each trusted compute cell (TCC) – the basic unit of individual control over data – enables users to curate their digital personas; manage the data that they collect, produce and distribute; manage privacy settings for the various social scenes and commercial vendors they interact with; and manage group-specific apps for secure communication and data-sharing.

The terms of interaction between an individual's private TCC and a "portal TCC" is mediated with OpenID Connect-authenticated API connections. These application-programming interfaces ascertain the terms of interaction and information-disclosure through "trust wrappers" or "trust manifests" that encase a communications module. "Wrappers" amount to digital legal contracts that outline the opt-in terms of agreement for online interactions. They specify what data may be collected, accessed, stored, etc.; what access control mechanisms and policies will govern data; and the "constitutional rules" by which groups may form, manage themselves and evolve.

By enabling individual users to express and enforce their own bottom-up preferences in the management of data, the Trust Compute Framework enables the development of entirely new types of network-based governance institutions. People can develop trusted online social and commercial relationships that can persist and scale. This capacity depends critically on people being able to control their own personal information – and to be able to efficiently authenticate other people's identities based on self-selected criteria for mutual association, trust and risk.

In such a network environment, one can imagine an ecosystem of "branded portals" emerging as central repositories for people's personal data. One can also imagine companies arising to serve as "trust providers" of social, secure, cloud-based applications. Users could begin to enjoy many benefits that stem from sharing their data (avoidance of advertising, group discounts, trusted interactions with affinity groups and strangers, etc.) Businesses that engage with this architecture (app developers, service providers, retailers) could gain trusted access to large, highly refined pools of personal data that can be monetized directly or indirectly, using new business models. Government institutions, similarly, could gain access to large pools of personal data without violating people's privacy or the Fourth Amendment, and craft more reliable, effective and demographically refined policies and programs. As a completely decentralized and open source platform, OMS cannot be "captured" by any single player or group. It aims to be always capable of the kinds of open-ended innovation that we have seen in open-source software, the Web and other open

platforms.

The Future of Governance

The OMS platform has sweeping implications for political governance in both theoretical and practical terms. It could transform the role of the State by empowering citizens to devise new forms of self-actualized institutions. These institutions would likely provide greater social legitimacy, efficacy and adaptability than conventional government. Instead of regarding political authority as something inherent in government and law, OMS seeks to ratify a deeper social reality – that authority is a *collective social process* that arises through the autonomous expressions of a group's needs, values and commitments. Legitimate authority is ultimately vested in a community's ongoing, evolving social life, and not in ritualistic forms of citizenship. Any new GFN software will clearly need to undergo refinement and evolution in the coming years. Yet Reed's Law suggests that this is the inevitable trajectory of the Internet and the economic and social changes that it is driving. We should embrace this future because it offers us a compelling pathway for moving beyond the many deep, structural impasses in our system of government, politics, economy and culture.

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[1] David P. Reed, "The Sneaky Exponential – Beyond Metcalfe's Law to the Power of Community Building," at http://www.reed.com/dpr/locus/gfn/reedslaw.html