Notes on networking standards and politics
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Abstract

The IETF cannot ordain what standards or protocols are to be used on networks, but the standards development process in the IETF does have an impact on society through its normative standards setting process. This document aims to bring about a better understanding on the political nature of standards and protocols. Among other things, the IETF’s work affects what is perceived as technologically possible and useful where networking technologies are being deployed, and its standards reflect what is considered by the technical community to be feasible and good practice. Whereas there might not be agreement among the Internet protocol community on the specific political nature of the technological development process and its outputs, it is undisputed that standards and protocols are both products of a political process, and they can also be used for political means.

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1. Introduction

"Science and technology lie at the heart of social asymmetry. Thus technology both creates systems which close off other options and generate novel, unpredictable and indeed previously unthinkable, option. The game of technology is never finished, and its ramifications are endless."

- Michel Callon

"The Internet isn’t value-neutral, and neither is the IETF."

- {{RFC3935}}
The design of the Internet through protocols and standards is a technical issue with great political and economic impacts [RFC0613] [RFC3271]. The early Internet community already realized that it needed to make decisions on political issues such as intellectual property; internationalization [BramanI]; diversity; access [RFC0101]; privacy; and security [RFC0049]; and the military [RFC0164] [RFC0316], governmental [RFC0144] [RFC0286] [RFC0313] [RFC0542] [RFC0549] and non-governmental [RFC0196] uses of the network. This has been clearly pointed out by Braman [BramanII].

Recently there has been increased discussion in the IRTF and IETF on the relation between Internet protocols and human rights [RFC8280], which spurred discussion of the value neutrality and political nature of standards. The network infrastructure is on the one hand designed, described, developed, standardized and implemented by the Internet community, while on the other hand the Internet community and Internet users are also shaped by the affordances of the technology. Companies, citizens, governments, standards development bodies, public opinion and public interest groups all play a part in these discussions. In this document we aim to outline different views on the relation between standards and politics, and seek to answer the question of whether standards are political, and if so, how.

2. Vocabulary Used

Politics (from Greek: Politika: Politika, definition "affairs of the commons") is the process of making decisions applying to all members of a diverse group with conflicting interests. More narrowly, it refers to achieving and exercising positions of governance or organized control over a community. Furthermore, politics is the study or practice of the distribution of power and resources within a given community as well as the interrelationship(s) between communities. (adapted from [HagueHarrop])

Affordances The possibilities that are provided to an actor through the ordering of an environment by a technology. This means that a technology does not determine what is possible, but that it that invites specific kinds of behavior, and in that process shapes it.

3. Research Question

Are protocols political?
4. Technology and Politics: a review of literature and community positions

In 1993 the Computer Professionals for Social Responsibility stated that ‘the Internet should meet public interest objectives’. Similarly, [RFC3935] states that ‘The Internet isn’t value-neutral, and neither is the IETF.’. Ethics and the Internet was already a topic of an RFC by the IAB in 1989 [RFC1087]. Nonetheless there has been a recent uptick in discussions within the IETF and IRTF about the impact of Internet protocols on human rights [RFC8280], and more generally in public debate about the impact of technology on society.

This document aims to provide an overview of the spectrum of different positions that have been observed in the IETF and IRTF community, and have been observed during interviews, mailing list exchanges, and during research group sessions. These positions were observed during participatory observation, through 39 interviews with members of the community, the Human Rights Protocol Considerations Research Group mailing list, and during and after the Technical Plenary on Protocols and Human Rights during IETF98.

Without judging them on their internal or external consistency they are represented here. Where possible we also sought to engage with the academic literature on this topic.

4.1. Technology is value neutral

This position starts from the premise that the technical and political are differentiated fields and that technology is ‘value free’. This is also put more explicitly by Carey: "electronics is neither the arrival of apocalypse nor the dispensation of grace. Technology is technology; it is a means for communication and transportation over space, and nothing more." [Carey]. In this view protocols only become political when it is actually being used by humans. So the technology itself is not political, the use of the technology is. This view sees technology as instrument; "technologies are ‘tools’ standing ready to serve the purposes of their users. Technology is deemed ‘neutral,’ without valuative content of its own.’" [Feenberg]. Feenberg continues: "technology is not inherently good or bad, and can be used to whatever political or social ends desired by the person or institution in control. Technology is a ‘rational entity’ and universally applicable. One may make exceptions on moral grounds, but one must also understand that the "price for the achievement of environmental, ethical, or religious goals...is reduced efficiency." [Feenberg].
4.2. Some protocols are political sometimes

This stance is a pragmatic approach to the problem. It states that some protocols under certain conditions can themselves have a political dimension. This is different from the claim that a protocol might sometimes be used in a political way; that view is consistent with the idea of the technology being neutral (for the human action using the technology is where the politics lies). Instead, this position requires that each protocol and use be evaluated for its political dimension, in order to understand the extent to which it is political.

4.3. All protocols are political sometimes

While not an absolutist standpoint it recognizes that all design decisions are subject to the law of unintended consequences. The system consisting of the Internet and its users is vastly too complex to be predictable; it is chaotic in nature; its emergent properties cannot be predicted. This concept strongly hinges on the general purpose aspect of information technology and its malleability. Whereas not all (potential) behaviours, affordances and impacts of protocols can possible be predicted, one could at least consider the impact of proposed implementations.

4.4. The network has its own logic and values

While humans create technologies, this does not mean that they are forever under human control. A technology, once created, has its own logic that is independent of the human actors that either create or use the technology.

From this perspective, technologies can shape the world. As Martin Heidegger says, "The hydroelectric plant is not built into the Rhine River as was the old wooden bridge that joined bank with bank for hundreds of years. Rather the river is dammed up into the power plant. What the river is now, namely, a water power supplier, derives from out of the essence of the power station." [Heidegger] (p 16) The dam in the river changes the world in a way the bridge does not, because the dam alters the nature of the river.

In the same way - in another and more recent example - the very existence of automobiles imposes physical forms on the world different from those that come from the electric tram or the horse-cart. The logic of the automobile means speed and the rapid covering of distance, which encourages suburban development and a tendency toward conurbation. But even if that did not happen, widespread automobile use requires paved roads, and parking lots and structures.
These are pressures that come from the automotive technology itself, and would not arise without that technology.

In much the same way, then, networking technology, such as protocols, creates its own demands. One of the most important conditions for a protocol’s success is its incremental deployability [RFC5218]. This means that the network already contains constraints on what can be deployed into it. In this sense the network creates its own paths, but also has its own objective. According to this view the goal of the network is interconnection and connectivity; more connectivity is good for the network. Proponents of this position also often describe the Internet as an organism with its own unique ecosystem.

In this position it is not necessarily clear where the ‘social’ ends and the ‘technical’ begins, and it could be argued that the distinction itself is a social construction [BijkerLaw] or that a real-life distinction between the two is hard to make [Bloor].

4.5. Protocols are inherently political

This position argues the opposite of ‘technological neutrality’. This position is illustrated by Postman when he writes: "the uses made of technology are largely determined by the structure of the technology itself" [Postman]. He states that the medium itself "contains an ideological bias". He continues to argue that technology is non-neutral:

(1) because of the symbolic forms in which information is encoded, different media have different intellectual and emotional biases;

(2) because of the accessibility and speed of their information, different media have different political biases;

(3) because of their physical form, different media have different sensory biases;

(4) because of the conditions in which we attend to them, different media have different social biases;

(5) because of their technical and economic structure, different media have different content biases.

Recent scholars of Internet infrastructure and governance have also pointed out that Internet processes and standards have become part and parcel of political processes and public policies. Several concrete examples are found within this approach, for instance, the IANA transition or global innovation policy [DeNardis]. The Raven process in which the IETF refused to standardize wiretapping – which
resulted in [RFC2804] - was an instance where an international governance body took a position that was largely political, although driven by a technical argument. The process that led to [RFC7258] is similar: the Snowden disclosures, which occurred in the political space, engendered the IETF to act. This is summarized in [Abbate] who says: "protocols are politics by other means," emphasizing the interests that are at play in the process of designing standards.

This position further holds that protocols can never be understood without their contextual embeddedness: protocols do not exist solely by themselves but always are to be understood in a more complex context - the stack, hardware, or nation-state interests and their impact on civil rights. Finally, this view is that protocols are political because they influence the socio-technical workings of reality and society. The latter observation leads Winner to conclude that the reality of technological progress has too often been a scenario where innovation has dictated change for society. Those who had the power to introduce a new technology also had the power to create a consumer class to use the technology "with new practices, relationships, and identities supplanting the old, -- and those who had the wherewithal to implement new technologies often molded society to match the needs of emerging technologies and organizations." [Winner].

5. IETF: Protocols as Standards

In the previous section we gave an overview of the different existing positions of the impact of Internet protocols in the Internet protocol community. In the following section we will review the standards setting process and its consequences for the politics of protocols, through the lens of existing literature on standards setting.

Standards enabling interoperating networks, what we think of today as the Internet, were created as open, formal and voluntary standards. A platform for Internet standardization, the Internet Engineering Task Force (IETF), was created in 1986 to enable the continuation of such standardization work. The IETF has sought to make the standards process transparent (by ensuring everyone can access standards, mailing-lists and meetings), predictable (by having clear procedures and reviews) and of high quality (by having draft documents reviewed by experts from its own community). This is all aimed at increasing the accountability of the process and the quality of the standard.

The IETF implements what has been referred to as an "informal ex ante disclosure policy" for patents [Contreras], which includes the possibility for participants to disclose the existence of a patent relevant for the standard, royalty-terms which would apply to the
implementers of that standard should it enter into effect, as well as other licensing terms that may be interesting for implementers to know. The community ethos in the IETF seems to lead to 100% royalty-free disclosures of prior patents which is a record number, even among other comparable standard organizations [Contreras]. In the following paragraph we will describe inherent tensions in the standards process.

5.1. Competition and collaboration

Standards exist for nearly everything: processes, technologies, safety, hiring, elections, and training. Standards provide blueprints for how to accomplish a particular task in a similar way for others that are trying to accomplish the same thing, while reducing overhead and inefficiencies. Although there are different types and configurations of standards, they all enhance competition by allowing different entities to work from a commonly accepted baseline.

On the first types of standards than can be found are "informal" ones - agreed-upon normal ways of interacting within a specific community. For example, the process through which greetings to a new acquaintance are expressed through a bow, a handshake or a kiss. On the other hand, "formal" standards are normally codified in writing.

Within economy studies, _de facto_ standards arise in market situations where one entity is particularly dominant; downstream competitors are therefore tied to the dominant entity’s technological solutions [Ahlborn]. Under EU anti-trust law, _de facto_ standards have been found to restrict competition for downstream services in PC software products [CJEU2007], as well as downstream services dependent on health information [CJEU2004].

Even in international law, the World Trade Organization (WTO) uses standards, although it recognizes a difference between standards and technical regulations. The former are voluntary formal codes to which products or services may conform, while technical regulations are mandatory requirements to be fulfilled for a product to be accessible in a national market. These rules have implications for how nation states bound by WTO agreements can impose specific technical requirements on companies. Nonetheless, there are many standardization groups that were originally launched by nation states or groups of nation states. ISO, BIS, CNIS, NIST, ABNT and ETSI are examples of institutions that are, wholly or partially, sponsored by public money in order to ensure the smooth development of formal standards. Even if under WTO rules these organizations cannot create the equivalent of a technical regulation, they have important normative functions in their respective countries. No matter what form, all standards enhance competition and collaboration because
they define a common approach to a problem. This potentially allows different instances to interoperate or be evaluated according to the same indicators.

The development of formal standards faces a number of economic and organizational challenges. Mainly, the cost and difficulty of organizing many entities around a mutual goal, as well as the cost of research and development leading up to a mutually beneficial technological platform. In addition, deciding what the mutual goal is can also be a problem. These challenges may be described as inter-organizational costs. Even after a goal is decided upon, coordination of multiple entities requires time and money. One needs communication platforms, processes and a commitment to mutual investment in a higher good. They are not simple tasks, and the more different communities are affected by a particular standardization process, the more difficult the organizational challenges become.

5.2. How voluntary are open standards?

 Cooperating transnational stakeholders in a process of negotiation and agreement through the development of common rules is a form of global governance [Nadvi]. Standards are among the mechanisms by which this governance is achieved. Conformance to certain standards is often a basic condition of participation in international trade and communication, so there are strong economic and political incentives to conform, even in the absence of legal requirements [Russell]. [RogersEden] argue:

"As unequal participants compete to define standards, technological compromises emerge, which add complexity to standards. For instance, when working group participants propose competing solutions, it may be easier for them to agree on a standard that combines all the proposals rather than choosing any single proposal. This shifts the responsibility for selecting a solution onto those who implement the standard, which can lead to complex implementations that may not be interoperable. On its face this appears to be a failure of the standardization process, but this outcome may benefit certain participants - for example, by allowing an implementer with large market share to establish a _de facto_ standard within the scope of the documented standard."

6. Conclusion

 Economics, competition, collaboration, openness, and political impact have been an inherent part of the work of the IETF since its early beginnings. The IETF cannot ordain which standards are to be used on the networks, and it specifically does not determine the laws of regions or countries where networks are being used, but it does set
open standards for interoperability on the Internet, and has done so since the inception of the Internet. Because a standard is the blueprint for how to accomplish a particular task, the adopted standards have a normative effect. The standardization work at the IETF has direct implications on what is perceived as technologically possible and useful where networking technologies are being deployed, and thus its standards reflect what is considered by the technical community as feasible and good practice.

Whereas there might not be agreement among the Internet protocol community on the specific political nature of the technological development process and its outputs, it is undisputed that standards and protocols are both products of a political process, and they can also be used for political means. Therefore protocols and standards are not ‘value-neutral, and neither is the IETF’ [RFC3935]. Thus we can answer the research question ‘are protocols political’ in affirmative fashion.

Further research could explore how the political nature of protocols can be taken into account in the standards development process in order to (1) to minimize negative unintended social consequences, (2) ensure clear understanding of the intended consequences, (3) maintain importance of the IETF as open standards body that facilitates global interoperability.

7. Security Considerations

As this draft concerns a research document, there are no security considerations as described in [RFC3552], which does not mean that not addressing the issues brought up in this draft will not impact the security of end-users or operators.

8. IANA Considerations

This document has no actions for IANA.

9. Acknowledgements

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10. Research Group Information

The discussion list for the IRTF Human Rights Protocol Considerations Research Group is located at the e-mail address hrpc@ietf.org [1]. Information on the group and information on how to subscribe to the list is at: https://www.irtf.org/mailman/listinfo/hrpc [2]

Archives of the list can be found at: https://www.irtf.org/mail-archive/web/hrpc/current/index.html [3]

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