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Strangers in a Strange Land:
Public Interest Advocacy and Internet Standards

Alan Davidson, John Morris, and Robert Courtney[1]

"Cookie" technology was introduced into the Netscape browser in the mid-1990s.[2] Cookies enable a variety of convenient features – for example, they enable Amazon.com to keep track of a "shopping basket" while you choose books to purchase. Similarly, cookies enable you to register once for nytimes.com and then later access that site without having to re-enter a username and password.

But as a technical matter, the use of cookies is not limited to adding convenience within a given Internet site. Instead, for example, cookies can be used by Internet advertisers to keep track of which sites you visit and which advertisements you view, thereby developing a broad picture of the types of sites and topics of interest to you. In some cases those advertisers can correlate that information with your name and contact information.

Cookies represent just one example where technical design decisions can have direct impact on issues of public policy concern – in this example, individual privacy. This paper discusses this reality more generally, and considers ways to inject a public voice into the technical design process.

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On the Internet, it is said that "code is law."[3] Seemingly narrow technical choices can have a broad and lasting impact on public policy and individual rights – more so even than traditional policy processes. These technical decisions are increasingly being made in the private bodies – such as the Internet Engineering Task Force (IETF) and the World Wide Web Consortium (W3C) – that set technical standards for the Internet. These and other key standards bodies operate largely outside of the public eye and with little input from public interest groups and many other stakeholders. How then can the public's interest be represented in these new venues of Internet design and governance? What steps can be taken to ensure that the

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[1] The authors all work for the Center for Democracy and Technology, a nonprofit Internet policy and civil liberties group based in Washington, DC. The authors are, respectively, CDT's Associate Director; the Director of CDT's "Standards, Technology, and Policy Project;" and a CDT Policy Analyst. This paper is based on work made possible through the generous support of the Ford Foundation, the Markle Foundation, and the Open Society Institute. The authors wish to acknowledge Jerry Berman, Matt Blaze, Scott Bradner, Lorrie Cranor, Becky Lentz, Jonathan Peizer, Allen Renear, Gigi Sohn, and Stefaan Verhulst, among many others, for their input, ideas, and feedback on the work of CDT's Standards Project, much of which is found in this paper.

[2] Although cookies were first introduced in December 1994 as part of Navigator 1.0, they did not become well known until the August 1996 release of Navigator 3.0, which included an "alert on cookies" option for users. Details of the original cookie specification are available in "Persistent Client State: HTTP Cookies," <http://wp.netscape.com/newsref/std/cookie_spec.html>.

[3] Lawrence Lessig, *Code and Other Laws of Cyberspace* (2000).

potential public policy implications of technical proposals are identified in the first instance, and then adequately considered as a given technology is defined and created?

It is well understood that technical standards, from building codes to "generally accepted accounting principles," can have important impacts on public policy concerns. But in the last decade no field has had the shape of its future as broadly influenced, in complex and sometimes arcane ways, by technical standards choices than the field of information and communications technology (ICT). Once the sole province of engineers, academics, and industry – the Internet's technocratic elites – technical decisions for ICT increasingly have far-reaching implications on property rights, personal privacy concerns, and the public's access to information.

Since 2000, the Internet Standards, Technology, and Policy Project of the Center for Democracy & Technology (CDT) has explored the public interest in ICT standards. The Standards Project has participated in the work of key Internet standards bodies, engaged technologists and policy experts, and has undertaken to inform and educate other policy advocates and policymakers about the ICT standards processes.

This paper is based on CDT's early experiences in raising a public voice in the context of Internet standards development. Our initial observations and conclusions include:

- **ICT standards can have important and long-lasting public policy impacts.** Technical design decisions can, for example, directly affect individual privacy, the potential for government censorship or surveillance, and the ability of smaller or poorer speakers to be heard.

- **Substantial barriers exist to broad stakeholder participation.** Systemic lacks of knowledge, time, money, and experience all stand in the way of productive participation in the standards development processes by advocates for the public interest.

- **When carefully undertaken, successful public interest participation in standards deliberations is possible.** When raised by technically "clueful" advocates in the context of on-going standards discussions, issues of public concern can be effectively addressed.

This paper discusses these observations, presents thoughts on future possible research, and suggests models for engagement of public policy issues and representation of broader public interests within key Internet standards processes. We suggest that greater capacity within the public interest community, additional processes for dealing with public policy issues within standards bodies, and greater communication and education between the policy and technical communities are all needed to adequately account for the public's interests in Internet standards.

I. The Growing Public Interest in Internet Technical Standards

The dramatic successes of the past ten years have brought the Internet to a remarkable present state: hundreds of millions of users incorporating the Internet into their daily lives, with a wealth of powerful, innovative applications at their fingertips. People from all walks of life are realizing the Internet's potential on a global scale.

But a corresponding realization is also taking place. This embrace of Internet technologies is fueling the public's interest in the Internet's future course of development. As the Internet is used by a wider segment of society for a wider range of uses, changes to the Internet have a correspondingly wider impact. Historically, Internet users have had (a) a high level of control over their communications, (b) great flexibility in how they use the Internet, and (c) a significant amount of privacy in their use of the Internet. Ensuring that these elements of control, flexibility, and privacy continue as the Internet evolves, and promoting the development of positive new features, are priorities.

Case Study: Internet Addressing

In 1998, an IETF standard describing a new protocol for Internet addressing – "Internet Protocol Version 6," or IPv6 – set off a major controversy about user privacy and anonymity.[4]

Under IPv4, the predecessor to IPv6, Internet addressing allowed a reasonable amount of privacy and anonymity, because the numeric address was typically not tied to any particular machine or user. With IPv6, however, the standard provided that in many cases a user's address would be derived from the unique MAC (Medium Access Control) address embedded in the user's Ethernet network card.[5] Because MAC addresses are a part of a computer's hardware and are not easily changeable, this prompted a concern that IPv6 would enable monitoring of users' online behavior, even if users disconnected and re-connected at different times or from different locations.

Significant debate ensued, both in the public policy space and among technologists. The issue was ultimately resolved with publication of a optional addressing scheme for IPv6 that added privacy-protecting alternatives to using MAC addresses.[6]

To pursue those priorities, advocates must turn to the Internet's technical standards bodies, the historic starting point for the Internet's basic architectural design and still the major source of its evolution. Yet to date meaningful interaction between the standards bodies' technologists and advocates for the public interest has been minimal.

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[4] See "Transmission of IPv6 Packets Over Ethernet Networks," RFC 2464, December 1998, at <http://www.ietf.org/rfc/rfc2464.txt>. IPv6 was designed, among other purposes, to alleviate a growing shortage of addresses under the current Internet addressing scheme, IPv4.

[5] MAC addresses are the 48-bit hardware addresses used to identify devices on an Ethernet network. All Ethernet-enabled devices have unique MAC addresses, so difficulties or collisions in routing can be avoided. More information about MAC addresses and how they are assigned is available at <http://www.erg.abdn.ac.uk/users/gorry/course/lan-pages/mac-vendor-codes.html>.

[6] See "Privacy Extensions for Stateless Address Autoconfiguration in IPv6," RFC 3041, January 2001, at <http://www.ietf.org/rfc/rfc3041.txt>.

Though many technologists within the leading standards bodies are public-minded, few have explicit expertise in policy-making or at interpreting the public interest. Standards organizations have always (appropriately) emphasized technical goals over societal ones, but in the Internet's early history there was a significant overlap between the two. Openness, accessibility, anonymity, and robustness were all technical features of the network that became public values as well. Additionally, since the Internet in its early days was small, the pressure for explicit public consultation was minimal – any policy impacts deriving from technical choices would affect just a few people.

The Internet's population and diversity of uses has grown enormously since the early days of the network, and hundreds of millions of users will have their experiences shaped by the decisions made today. Although many past standards were consistent with the public's interest, it is far from clear that, barring a new effort at representing the public interest, future standards will do so.

Case Study: Cable Modem Standards

Internet service over cable television systems, using "cable modems," rely on a standardized communications protocol called DOCSIS ("Data Over Cable Service Interface Specification") as the standard for transmission of Internet data over cable television networks. DOCSIS was created in the mid-1990s, with virtually no public input, by CableLabs, an industry consortium controlled by the cable companies.

As originally designed, DOCSIS was heavily weighted towards downstream traffic – i.e., data from the Internet to a user's computer moved far faster than information transmitted from the user to the Internet. This design limitation severely limited the ability of users to utilize any Internet services that required significant upstream data transfers, including voice-over-IP, videoconferencing, or the operation of personal servers.

Users pushed back against this aspect of DOCSIS, and eventually the cable companies moved to eliminate the downstream bias, first in DOCSIS 1.1 (which increased the upstream data rate fourfold) and, more recently, in DOCSIS 2.0 (which further triples the upstream rate).[7]

The Internet standards process has evolved in recent years. The introduction in the early 1990s of commercial traffic to the Internet began an influx of private interests to a standards community that had been largely research-oriented. The subsequent explosion in commercial use of the Internet prefigured a significant increase in the number of privately-motivated participants in the standards process. The increase signaled a subtle change for Internet standards-making: while many of these participants make high-quality contributions to the standards process – indeed, many of the Internet's original designers, still active in the standards process, have left academia for private sector employment – the extent to which participants can be expected to be in agreement about certain aspects of the network's architecture is diminished. It is a testament to the strength of the standards bodies' deliberative process that "rough consensus and running code" continues to be a functional way to make technical decisions.

[7] More information about DOCSIS is available at <http://www.cablemodem.com/>. For information on the evolution of DOCSIS, see Fanfelle, Robert, "DOCSIS 2.0: Upping Upstream Performance in Cable Modem Designs," EE Times, 17 June 2002, available at <http://www.eetimes.com/story/OEG20020617S0011>.

Participants work hard to resolve conflicts and to reach consensus on the future of the network.

And yet there is a risk that the public interest in standards – implied for so many years – could fade into the background of discussion among private interests. There is a need for public interest advocates to take the lead in more explicitly evoking the public interest in standards-making.

The "Case Studies" that appear above illustrate some examples of adverse impact on Internet users that can flow from technical design decisions. These examples – cookies, IPv6 addressing, and cable modem standards – are just three of a wide array of situations in which information and communications technologies (ICT) standards setting affects public policy concerns. Other examples of important policy questions raised by technical standards include (a) whether wireless location-tracking technologies will allow users to control who can track their location, (b) whether standards for electronic "e-books" will accommodate the needs of blind users, (c) whether "digital rights management" technologies to protect intellectual property will allow users to make lawful "fair use" of copyrighted content, and (d) whether third parties will be able to modify, without permission, Internet content as it is transmitted from the sender to the recipient.

I. Internet Standards Bodies: Venues for Possible Public Participation

The impact of technical standards decisions on public policy concerns can arise in a wide range of different types of standards bodies, ranging from the large and comprehensive (such as the IETF) to smaller, more tightly focused bodies (such as the Internet Mail Consortium). The two standards bodies that have the broadest impact on the Internet are the IETF and the W3C:

The Internet Engineering Task Force (IETF) – The largest and most influential of the Internet's standards bodies, the IETF continues to be the forum for most online standards work. Much, but not all, of the IETF's focus has been on the development and evolution of the core networking protocols (such as TCP/IP) and the basic Internet applications (e.g., SMTP for e-mail). The IETF began in January 1986 as a small forum to bring together in an offline setting the researchers, academics, and engineers who had been building Internet standards online since the late 1960's. Many of its institutions, including its renowned RFC[8] series, evolved from an earlier, informal body called the Network Working Group (NWG). An early organization for Internet standards-setting, the NWG collaboration not only

[8] "Requests for Comments." The RFC series constitutes the IETF's primary body of work. Once developed, Standards are published as RFCs, but other categories of work such as experimental protocols, informational documents, and proposed/draft standards are also included in the RFC series. To avoid confusion, established Internet Standards are now indexed both in the RFC series and in the Standards-only STD series. (RFC 1792, "Not All RFCs are Standards"; RFC 3160, "The Tao of the IETF".) RFCs can be located at <http://www.ietf.org/rfc.html> or <http://www.rfc-editor.org/>.

established many of the Internet's core standards, but also set the basis of the consensus-based process still used by the IETF.[9]

Like the Internet itself, the IETF is a decentralized confederation of equals. Those who participate do so on a volunteer basis, and the trappings of formality – business suits, political posturing, and elaborate hierarchies – are generally rejected. Most of the IETF's work is conducted over e-mail lists with open memberships, so barriers to participation are low and communication is high-speed. The organization has formal meetings three times a year, which are now attended by hundreds of participants. Important decisions are made by "rough consensus." The Internet's success to date is a testament to the success of the IETF. One reason for the effectiveness of IETF standards has been that the same network operators and researchers who later became the standards' primary users created them. At the same time, the IETF's fluid structure and emphasis on near-instant electronic communication has helped it stay abreast of new technologies and adapt to a rapidly-evolving network environment.

The World Wide Web Consortium (W3C) – Founded in 1994, the W3C is a membership organization that sets standards and guides the evolution of the World Wide Web. W3C in its standards activities more closely resembles its offline standards-setting counterparts than the IETF. Only members may participate in W3C, and W3C's activities are supported by member dues. Similarly, much of the W3C's work takes place on member-only lists, and the W3C web site has a substantial member-only section. Many W3C activities are not standards-related; there are working groups dealing with web authoring, public policy issues, social interactions, and aesthetics. W3C standards are publicly-available and generally royalty-free, and are designed by the same engineers that will later use them – in this case, major web developers and content providers. However, unlike the IETF, W3C has no provisions for direct end-user involvement, other than involvement through intermediaries such as non-profit organizations.

Although IETF and W3C are the most important Internet-focused standards bodies, they are just two of many standards bodies that affect the Internet. Beyond the IETF and W3C, the relevant standards bodies can be divided into several loose and frequently overlapping categories:

Traditional Telecommunications Standards Groups. These organizations come from outside the Internet space, where they frequently have long and well-known histories of standardization in a wide variety of technologies including, but not limited to, telecommunications. Participation in these groups is usually very different from participation in IETF or W3C, with complicated hierarchies of authority and codes of conduct that have been developed over decades. Additionally, access to the work of these groups sometimes is contingent on either membership or the payment of fees for official documents. Organizations in this category include the American National Standards Institute (ANSI), the International Telecommunications Union's Telecommunications Standardization Sector (ITU-T), the European Telecommunications Standards Institute (ETSI), and Joint Technical Committee 1

[9] Hafner, Katie, and Matthew Lyon, *Where Wizards Stay Up Late,* 1996.

of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) (ISO/IEC JTC1).

- **Secondary Internet Technical Standards Groups.**[10] These groups have a more narrow focus, working on specific standards or protocols that will upon deployment have some impact on the Internet. Many (but not all) of these groups are private in nature, with high membership fees, complicating public interest involvement. Examples include the Organization for the Advancement of Structured Information Standards (OASIS), the ENUM Forum, the Wireless Application Protocol Forum (WAP-Forum), the 3rd Generation Partnership Program (3GPP), the European Computer Manufacturer's Association (ECMA), and the Unicode Consortium.

- **Tertiary Internet Technical Standards Groups.** These groups work on highly specific elements of technical applications or Internet-related markets. Some of these are private, with high barriers to entry for public interest advocates. Others are more public in nature. This category varies widely. Examples include the Internet Mail Consortium (IMC), the Object Management Group (OMG), and the Virtual Private Network Consortium (VPNC).

II. Lessons Learned: Guidelines for Effective Public Input into Internet Standards Setting Processes

To be effective, public policy input must be tailored to the standards bodies' unique needs and expectations. The organizations that develop Internet standards have organizational structures, expectations, and priorities that will be unfamiliar to many public interest advocates. Moreover, the style of public policy advocacy and lobbying that is effective in the traditional public policy venues of legislatures and government agencies is particularly unsuited to the atmosphere of most Internet standards setting bodies. Although sound bites, broad generalizations, and rhetorical overstatements can be effective among lobbyists and legislators, they are precisely the wrong tools to be effective in most standards setting discussions. A new approach, combining respect for technical procedures and goals with clear thinking about public policy effects, must be adopted.

Effective policy advocacy in the standards setting context requires recognition of a number of key guidelines:

- *Participation requires a strong technical understanding of proposed standards and their context.* Many standards proposals affect highly technical and specific elements of the internetworking process, and one must understand both the specific proposal and the network context of the proposed change to assess the policy impact. Addressing policy concerns can significantly complicate an otherwise-technical discussion, and any argument in favor of a policy solution must be made clearly and

[10] The terms "secondary" and "tertiary" in these categorizations are not reflections of the groups' value or importance, only on the overall scope of their work. The higher the degree, the more narrow the scope.

with a good understanding of the technical implications. Prior to commenting on a given issue, public interest advocates must be prepared to spend the time needed – sometimes weeks or months – to develop the requisite technical background.

- *The effects on the public interest of proposed standards are often subtle; advocates must cultivate special sensitivities in order to flag important discussions in a timely way.* Although in some cases the policy impacts of a technical proposal will be self-evident, frequently they will be hidden behind several layers of interpretation and abstraction. Advocates also must be able to identify and act on key decision points where, presented with two options of near-equal value from engineering and efficiency perspectives, there are subtle public policy reasons to prefer one option over another.

- *Advocates need to be prepared to commit up front to substantial investments of time and energy necessary to follow ongoing internal discussions about a given policy proposal.* Few if any of the issues standards bodies address will remain static. Many of the questions are moving targets – standard discussions can progress quickly, and the set of challenges that exists when a standard is proposed may evolve just as quickly. Also, the relative value of a contribution is frequently judged by the contributor's willingness to follow-up and to find workable answers to questions raised. Long-term commitment to the standards development process is necessary.

- *Standards bodies have different membership structures and requirements; an advocate must be prepared to support its appropriate role.* Standards bodies' membership structures spread across a spectrum ranging from the broadly open (IETF) to more closed working groups and consortia (CableLabs, WAP Forum). Frequently membership dues and other participation prerequisites apply, and advocates should be prepared to undertake such costs. Sometimes, though not always, interaction with the bodies' leadership can lead to discounted or even free participation, though other restrictions may still apply.

- *Many standards bodies have an inherent wariness towards public interest advocates that must be respected.* Many of the standards bodies harbor some institutional bias and mistrust of lawyers and policy advocates. In some cases, the wariness is well-bred – in past experiences, advocates have frequently raised issues without appreciating the technical implications of their arguments. New representatives for the public voice have a responsibility to prove themselves by developing records of thoughtful, constructive input.

- *Different standards bodies have different expectations and requirements; advocates must familiarize themselves with the special features of any body they intend to contribute to*. Not all standards organizations are the same; they have different customs, different procedures, and different expectations about their participants. If one is to make a substantive impact, one must understand the standards body at issue and play by its rules. Poor or incomplete knowledge of the standards process can be misinterpreted as a lack of respect for them, potentially derailing an advocate's input.

These features set a high bar for advocates' effective entry into standards discussions, but they are not absolute barriers. With the right kind of commitment, interactions with the standards-making community can effectively raised public concerns within the context of the standards processes.

III. Models of Public Interest Involvement in Standards Development

As a limited number of examples over the past five years indicate, standards bodies have confronted and grappled with public policy issues, with varying levels of input from the traditional public policy community. Four examples – two from the recent past and two from the present day – illustrate that public policy issues can arise in a variety of contexts, and public policy input can take place in a variety of ways:

- **IETF Raven Debate.** In 1999, the IETF confronted the question of whether it should take any action to build wiretapping capability into the Internet. The issue first arose in the discussions of an IETF working group focused on the interaction between the Internet and the traditional telephone system. The leadership of the IETF decided that the issue was of such significance that it warranted discussion and decision by the entire IETF community (and the bulk of the discussion took place on the "Raven" mailing list).[11] Public policy organizations such as the American Civil Liberties Union (ACLU) and the Center for Democracy & Technology (CDT) did contribute to the debate, but most of the discussion was among members of the IETF community.[12] Ultimately, the IETF community decided that any effort to build wiretapping capability into the Internet would create significant and unacceptable security risks.[13]

- **W3C P3P Project.** The Platform for Privacy Preferences (P3P) is a specification that enables web sites to express – in a machine-readable way – their practices with regard to users' personally identifiable information (PII).[14] P3P permits users to quickly interpret privacy policies whose complexity might otherwise be disarming, and to make informed choices about disclosure. The P3P specification was formally published by the World Wide Web Consortium (W3C) in April 2002 after nearly five years of work. Numerous members of the public advocacy community and Internet industry participated actively in P3P's development from a very early stage, providing extensive input into the vocabulary P3P uses to describe all the various practices and implications for personally identifiable information. As of this writing, P3P policies exist on hundreds of major web sites and new consumer-oriented tools that utilize

[11] For the initial explanation of this decision, see <http://www1.ietf.org/mail-archive/working-groups/raven/current/msg00000.html>.

[12] The entire Raven discussion list is found at <http://www1.ietf.org/mail-archive/working-groups/raven/current/maillist.html>.

[13] For the IETF's explanation of its decision on wiretapping, see <http://www.ietf.org/rfc/rfc2804.txt>.

[14] More information about P3P is available at <http://www.w3.org/P3P/>.

P3P, including both major web browsers, have just been released pointing to slow but steady growth for the standard. The public advocacy involvement in the P3P has elsewhere been described in detail by one of the co-chairs of the P3P development process, Lorrie Cranor.[15]

- **IETF OPES Working Group.** Over more than a year starting in 2000, the leadership of the IETF grappled with whether to sanction a proposed working group on "Open Pluggable Edge Services" (OPES). The proposed OPES protocol would permit operators of cache and other servers in the middle of the Internet to modify content in mid-stream from a server to a user. These proposals raise significant questions about data integrity and user privacy. Some within the IETF community raised concerns about the OPES proposals. In August 2001, as part of its Standards Project, CDT submitted extensive comments about the issues raised by OPES to the leadership of the IETF. In response to the concerns raised, in late 2001, the Internet Architecture Board, which provides architectural guidance to IETF, undertook an extensive review of the OPES proposals. In November 2001, IAB released its recommendations, urging that any work on OPES include strong protections for data security and privacy. CDT has continued to monitor the work of the working group work to ensure that OPES development continues on this track.[16]

- **IETF GeoPriv Working Group.** Out of a concern that privacy was not receiving sufficient attention in proposals for location tracking technologies, the IETF leadership created the GeoPriv working group to design a protocol for privacy protection in location based services. The working group seeks to address the privacy of sensitive "location" information used in a variety of emerging technologies by creating a specific format for the expression of location privacy and security preferences. The way those preferences are expressed and enforced will likely have a broad impact on user privacy and control. Although this effort has similarities to P3P, it will be tailored to some unique characteristics of location information, and critically, the new platform is expected to include default privacy requirements to be applied in the absence of any privacy rules created by a user. The CDT Standards Project has been actively involved in GeoPriv since the working group's first meeting in August 2001, and has submitted several Internet-Drafts[17] – in collaboration both with other privacy advocates, and with technologists from IETF – on important privacy priorities for the new standard. Although very much a "work in progress," the GeoPriv effort shows the potential of cooperation between IETF technologists and the privacy community.

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[15] See Lorrie Cranor, "The Role of Privacy Advocates and Data Protection Authorities in the Design and Deployment of the Platform for Privacy Preferences," available at <http://www.cfp2002.org/proceedings/proceedings/cranor.pdf>.

[16] For a more detailed discussion of OPES and the issues it raises, see Standards Bulletin 1.02, August 7, 2002, available at <http://www.cdt.org/standards/bulletin/1.02.shtml>.

[17] Internet-Drafts are the IETF's primary form of working document. For a more detailed discussion of the GeoPriv working group, see Standards Bulletin 1.01, May 28, 2002, available at <http://www.cdt.org/standards/bulletin/1.01.shtml>.

Looking more broadly, the interaction between the public interest community and the technical standards setting bodies can be roughly categorized into three possible models of public interaction with those standards bodies. On-going and active participation in a standards working group requires a very significant commitment of time. The generally accepted guideline is that meaningful participation in any active working group requires a baseline of approximately 20% of a staff person's time (1 day of work and meetings per week plus tri- or semi-annual conferences.) Although such direct participation is clearly the most effective way to have an impact on a particular standards proposal, the sheer number of standards bodies and working groups dictates that careful choices must be made about the models adopted for involvement with standards bodies.

Possible models for public policy interaction include:

- **Direct Ongoing Public Representation within the Standards Bodies.** Clearly the most effective, but also time and resource intensive, approach to a standards setting body is the long term direct participation by technically aware policy advocates in the meetings and discussions of the group. Individual policy advocates, and to a lesser extent policy organizations, can build a reputation within the standards bodies and can directly work to influence the technical standards work. The ability to integrate public policy concerns into the technical context of the standards work will maximize the impact of the advocacy.

- **Ad Hoc Public Representation to the Standards Bodies.** Less effective but less resource intensive would be the advocacy to a standards setting body as an "outsider" who does not participate in the day-to-day work of the group and thus who may not have any favorable reputation within the group. Such public representation could take the form of a single in-person presentation to a group, a written submission to a group, or possibly the participation on a one-time basis in the discussions of a particular working group. Although such advocacy can be more easily dismissed once a presentation is complete, a thoughtful and technically aware presentation could still have an impact.

- **Monitoring of Standards Proposals and Actions.** For certain standards groups, direct representation within or to the group may be ineffective (because of the structure of the group, and/or the agendas of the members or controlling entities) or unnecessary (because of the lack of controversy or relatively low level of policy importance of the standards work). Even for these groups, however, there is likely to be value in the public policy community being informed about the work of the group. The work of some (but not all) standards bodies can be tracked through public mailing lists or web sites, and thus can be monitored and interpreted for the benefit of the public policy communities.

Any public policy effort focused on Internet standards setting bodies will likely use a mix of these models of involvement, depending on the characteristics of the standards bodies, the resources available, and the importance of a public policy issue. With some standards bodies, such as the IETF and W3C, on-going direct public representation from within will be the most

effective approach. Other standards groups may only warrant on-going monitoring, with direct involvement reserved to limited key issues as they arise.

IV. Conclusions: An Agenda For Future Activity

Public interest advocacy in ICT standards bodies presents real challenges. It is increasingly clear that ICT standards can have broad impacts on a variety of public policy interests. Yet while these impacts are real, they are often complex, attenuated and long-term – making it hard to engage many stakeholders. While standards bodies pose few overt barriers to participation, numerous capacity problems and other barriers in fact exist for NGOs and public interest groups – preventing representation of many public stakeholders in standards activities. And while good models may exist for public interest representation in standards bodies, they are often resource intensive and may not scale across many issue areas and many interest groups.

As a result, there are reasons to believe that ICT standards processes will increasingly fail to represent important public stakeholder interests.

What then to do? The conceptual problems and capacity gaps raised in this paper suggest a broad program of further work to better understand the implications of ICT standards and to improve public representation in the creation of those standards. These include:

- **Further research on a conceptual framework for a public voice in ICT standards** – Additional work is needed to more completely answer fundamental questions such as: What is the public interest in ICT standards? What values should be represented, or are not represented today? What barriers to broad participation exist, and why is it important that they be addressed?

- **Further research on successful models of engagement** – The experiences of CDT and others provide some examples of successful public interventions in standards processes. But these examples have often been resource intensive, and it is not obvious that they scale well across the large number of potentially important standards and the potentially impacted interests. Other models for engagement – through more systemic approaches such as policy impact assessments in standards bodies, or through methods that leverage the expertise within a few groups so that it can be used by many – need to be explored. Lessons are certainly to be learned from other fields where the impact of standards is better understood.

- **Continued direct representation and engagement today** – While research is needed, technical decisions with far-reaching impact continue to be made in ICT standards. On a parallel track with research efforts, public interest advocates need to build their capacity for direct representation in the standards efforts underway today. Modest investments in energy and resources may make a big difference in the shape of these standards: The difference between nobody raising policy concerns with a standard, and one voice raising those concerns, is huge.

- **Greater education and dialogue among policymakers, technologists, and advocates** – While targeted interventions and catalytic models of engagement are likely to make a big difference in the most visible and important standards, a true systemic approach might be found in heightened understanding of policy impacts and technical processes. If the technologists crafting standards were more broadly trained to appreciate the social context and policy impacts of their choices, there would be less need for outside stakeholder interventions. If policymakers and public interest advocates better understood the technical arena, they would be more inclined to participate in standards processes and better poised to understand the impacts of policy on technology development.

Together these present an ambitious agenda for a public advocacy community already overtaxed, under-resourced, and struggling to understand and realize the potential offered by the Internet and other ICT. As hard as it may be, the public's voice must be better represented in decisions about code and standards. The locus of policy-making is changing, away from the legislatures and courts we are most familiar with. At this fertile time of continuing change in the architecture of the Internet, choices are being made today with far-reaching impact that demand we adequately account for the public's interests in Internet standards.