I. Introduction

Who we are (e.g. our thoughts, dreams, feelings, DNA sequence), what we own (such financial property), what we have experienced (audio/visual/olfactory transcripts), and how we can be reached (location, endpoint identifiers) are among the most private pieces of information about us. More and more of this information is being digitized and made available electronically. As this information becomes more available, it gets exposed in unpredictable and surprising ways.

From the long experience of the IETF, the authors believe that an important initial step is to consider privacy while designing protocols and architectures, rather than as something to 'bolt on' as an afterthought. The IETF has successfully applied this method with a number of design criteria in its process, most notably security.

As we illustrated in our position paper to the "W3C Workshop on Privacy for advanced Web APIs" [1], the IETF has been considering privacy in our protocol designs already for many years, although often implicitly and without thorough documentation. Additionally to the completed RFCs with IETF consensus there is a range of ongoing activities with relevance for privacy in the IETF as well and a few efforts are highlighted in [1].

The IAB has a number of tasks and among them is the architectural oversight function. As part of this task, IAB members investigates challenges the Internet faces and to determine what the IETF, other standards organizations, and the broader Internet community can do to help making the Internet work better. Some of the activities span multiple IAB generations. The name for such a longer term effort is called 'program' and the current IAB members have decided to create a privacy program to improve the quality of the IETF specifications, to solicit input from communities outside the IETF, and to engage in a dialog with regulators. The work also includes the development of guidelines with respect to the handling privacy sensitive information in IETF protocols, and to offer help in the form of reviews and education quite similarly to the way how the work on security is dealt with.

More details about the privacy program and other programs by the IAB please take a look at [2].

While we are sure that we take steps into the right direction we also try to be cautious. Among engineers it is known that in the development of protocols and architectures many design considerations need to be taken into account and balancing between conflicting goals is difficult, as illustrated by Clark, et al. in "Tussle in Cyberspace: Defining Tomorrow’s Internet" [3]. Privacy, although very important, is only one design aspect among many. In addition to consider privacy early in the design process in a standards development organization, like the IETF, there are further challenges that need to be tackled:

- To keep up with the speed of innovation at the application layer the IETF typically does not standardize very specific applications but rather develops building blocks and tools useful for an entire class of applications. Since a lot of the semantic comes with the very specific application developers can easily damage privacy properties build into the lower layers. As an example: The IETF developed the specifications for HTTP and HTTP acts as a transport mechanism for millions of applications on the web. It would be inappropriate to demand to cover a discussion about the potential threads of those applications, such as games, social networks, etc., in the HTTP specification particularly since many of the usage environments are not known at the time of writing; a common feature of widely successful protocols.

- Technical work needs to be backed-up by laws and appropriate disincentives to violate them. Providing the right incentives for companies to consider privacy friendly design will be a game changer.

- The best technology will not help end users if it does not get implemented properly and deployed in a privacy friendly way. This is a lesson that can be learned from the area of security. In addition, it turned out that the usability plays an important role in the success or failure of a security mechanism. We expect similar problems with privacy technology and encourage the community (including standards organizations) to investigate user interface aspects early in their experiments with running code.

- While the understanding of security has greatly improved over the years and more experts are available we have not
always been so fortunate. Since privacy is a less mature field only very few privacy experts are available in some communities.

- Organizational structures of some standards development organizations lack the checks and balances that might favor privacy controls for users over implementation expedience.

II. CONCLUSION

The IETF together with the IAB have worked on privacy and privacy-related topics over a long timeframe. As is the case with security, privacy-sensitive work is of higher quality if privacy is considered early in its design process. The IETF achieved these results by involving a broader community, including privacy experts with technical as well as legal background, from early on. The open nature of the IETF makes participation for a wide range of experts easy, and keeps the barrier for participation low. The organizational structure and the detailed review process of documents creates an ideal environment for developing high-quality work in a way that organizations focused on implementation expedience might find difficult to replicate.

The IETF has not yet developed a global policy on privacy, but it has arrived at more or less the same position in several work areas. Part of the ingoing IAB privacy program is to sort out if a generalized IETF position can developed into a set of principles and guidelines to be followed by future IETF specifications and, hopefully, to inspire other bodies that deal regularly with privacy-sensitive information.

While the IETF has made important strides forward, the challenge to make the Internet work better is ongoing. We maintain that the W3C, the IETF and the Internet community of privacy experts must work together to provide an online experience that conforms with user expectations of privacy and the emerging regulatory environment. To facilitate the exchange of ideas on what technology can do to improve privacy on the Internet a workshop organized by the IAB, the W3C, ISOC and MIT will be held early December in Boston/MIT.

REFERENCES