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**Privacy Requirements for IETF Protocols**  
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Abstract

It is the consensus of the IETF that IETF protocols be designed to avoid privacy violations to the extent possible. This document establishes a number of protocol design choices as Best Current Practices for the purpose of avoiding such violations.

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## **1. Introduction**

The IETF has long-standing principles that support strong security in protocol design and a tradition of encouraging protocol designers to take these principles into account. [RFC1984] articulated the view that encryption is an important tool to protect the confidentiality of communications, and that as such it should be encouraged and available to all. [RFC3365] requires that all protocols implement strong security. [RFC3552] provides guidance about how to consider security in protocol design and how to document security choices. In [RFC2804], the IETF established a policy of not considering wiretapping requirements in IETF protocols. [RFC6973] explains the many different aspects of privacy that can be affected by Internet protocol design and provides guidance to help designers consider privacy in their work. This document extends the existing body of IETF principles concerning security by articulating Best Current Practices for avoiding egregious privacy violations and establishing support for privacy as a principle of IETF protocol design.

These principles, old and new, should be applied when designing new protocols, and where applicable, should be considered for updates of existing protocols.

Discussion of this draft is directed to the [ietf-privacy@ietf.org](mailto:ietf-privacy@ietf.org) list.



## **2. Terminology**

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [\[RFC2119\]](#). These words take their normative meanings only when they are presented in ALL UPPERCASE.

"Opportunistic encryption" is defined as encryption without any pre-arrangement specific to the pair of systems involved (see [\[RFC4322\]](#)).

Privacy-specific terminology is provided in [\[RFC6973\]](#). Of particular relevance to this document is the term "personal data," defined as "any information relating to an individual who can be identified, directly or indirectly." Identifiers such as IP addresses that can remain consistent over time or that particular parties associate with directly identifiable information (such as a real name or street address) are therefore considered to be personal data.



### **3. Recommendations**

There are inherent privacy risks with protocols that allow the communicating parties to store personal data, transport personal data, or are vulnerable to other parties observing the personal data in the exchanged communications. Most Internet communications involve such risks, which can allow entities to build large databases of information that by themselves or in conjunction with other databases can identify people and their actions in invasive ways.

Therefore, to the extent consistent with basic protocol operation and management, standards-track IETF protocols that involve transmission of personal data:

1. MUST minimize their use of such personal data, and,
2. where personal data is sent, MUST have well-defined and interoperable ways to send such data encrypted for the intended recipient(s).

While existing principles call for strong security, it is important to note that strong security only in cases where the other party can be authenticated does not by itself solve all privacy problems. To guard against dangers of large-scale privacy attacks, some protection is needed also for other situations. As a consequence, at minimum, opportunistic encryption needs to be well-defined for almost all new IETF standards track protocols. In most cases it will be better to (also) specify how to do mutually authenticated encryption. Encryption provides one aspect of privacy protection, namely confidentiality.

Note that this is contingent on practicality - if some personal data really has to be sent in clear for a protocol to be able to operate, and even opportunistic encryption is not possible, then a standards-track protocol that does not define how to protect that data will be consistent with this BCP. The IETF will have to decide in such cases whether standardising that protocol benefits the Internet or not.

Many IETF protocols allow for some data items to be optionally or conditionally sent. If personal data can be sent, then the conditions above apply.

Specifications that do not meet the criteria above MUST include (or reference) an explanation of why they do not conform to this BCP.





#### **4. Examples and Explanation**

This section has some examples and explanatory material. [[More, including references, will be added as discussion evolves.]]

DHCP is an example of a protocol where it seems quite hard to provide useful confidentiality. Should a new DHCP option be defined that carries personal data, then the IETF would have to decide if the benefit of that outweighs the potential privacy cost.

For some protocols, layering on top of a security protocol like TLS, SSH or IPsec can be a useful way to provide confidentiality. However, just because it could be possible to do that does not mean that that is sufficient to claim conformance with this BCP. For example, claiming that Diameter conformed to this BCP because one could in principle run Diameter over IPsec would not be credible, as it seems that such deployments are rare to non-existent. In the same way that being realistic is important when we consider a claim that sending personal data is unavoidable, it is just as important when claiming that layering on top of a security protocol can meet the requirements of this BCP.

For some protocols, minimizing the use of personal data involves limiting the lifetime of identifiers. In cases where an identifier refers to an individual (or a proxy for an individual, such as a host device or software instance), the longer that identifier persists and the more contexts in which it is used, the more it can facilitate correlation and tracking of information related to the individual and his or her activities. Creating identifiers that have limited lifetimes by default reduces the possibility that multiple protocol interactions or communications can be correlated back to the same individual. [[RFC4941](#)] provides an example in the case of stateless autoconfiguration of IPv6 interface identifiers.

Since the goal here is to have a BCP that covers all IETF standards track protocols we clearly cannot address all aspects of privacy, for example user participation, since that would only be relevant for a small proportion of IETF protocols.

One could consider minimising the personal data sent by IETF protocols as a form being conservative in what you send, one of the longest standing principles in IETF protocol design. There doesn't seem to be an equivalent here for being liberal in what you accept.



## **5. Security Considerations**

This document articulates a set of Best Current Practices for privacy that extend the IETF's existing security principles. [To do: Fill in some text about potential tension between privacy and security, e.g., with non-persistent identifiers, etc.]

## **6. IANA Considerations**

This document does not require actions by IANA.

## **7. Acknowledgements**

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