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 Guidelines for Human Rights Protocol and Architecture Considerations

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Abstract

 This document sets guidelines for human rights considerations for

 developers working on network protocols and architectures, similar to

 the work done on the guidelines for privacy considerations [RFC6973].

 This is an updated version of the guidelines for human rights

 considerations in [RFC8280].

 This document is not an Internet Standards Track specification; it is

 published for informational purposes.

 This informational document has consensus for publication from the

 Internet Research Task Force (IRTF) Human Rights Protocol

 Considerations Research Group. It has been reviewed, tried, and

 tested by both by the research group as well as by researchers and

 practitioners from outside the research group. The research group

 acknowledges that the understanding of the impact of internet

 protocols and architecture on society is a developing practice and is

 a body of research that is still in development.

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1. Introduction

 This document outlines a set of human rights protocol considerations

 for protocol developers. It provides questions engineers should ask

 themselves when developing or improving protocols if they want to

 understand how their decisions can potentially influence the exercise

 of human rights on the Internet. It should be noted that the impact

 of a protocol cannot solely be deduced from its design, but its usage

 and implementation should also be studied to form a full protocol

 human rights impact assessment.

 The questions are based on the research performed by the Human Rights

 Protocol Considerations (hrpc) research group which has been

 documented before these considerations. The research establishes

 that human rights relate to standards and protocols, and offers a

 common vocabulary of technical concepts that influence human rights

 and how these technical concepts can be combined to ensure that the

 Internet remains an enabling environment for human rights. With

 this, the contours of a model for developing human rights protocol

 considerations has taken shape.

 This document is an iteration of the guidelines that can be found in

 [RFC8280]. The methods for conducting human rights reviews

 (Section 3.2), and guidelines for human rights considerations

 (Section 3.3) in this document are being tested for relevance,

 accuracy, and validity. The understanding of what human rights are

 is based on the Universal Declaration of Human Rights [UDHR] and

 subsequent treaties that jointly form the body of international human

 rights law [UNHR].

 This document does not provide a detailed taxonomy of the nature of

 (potential) human rights violations, whether direct or indirect,

 long-term or short-term, certain protocol choices might present. In

 part because this is highly context-dependent, and in part, because

 this document aims to provide a practical set of guidelines.

 However, further research in this field would definitely benefit

 developers and implementers.

 This document is not an Internet Standards Track specification; it is

 published for informational purposes.

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 This informational document has consensus for publication from the

 Internet Research Task Force (IRTF) Human Right Protocol

 Considerations Research Group. It has been reviewed, tried, and

 tested by both by the research group as well as by researchers and

 practitioners from outside the research group. The research group

 acknowledges that the understanding of the impact of internet

 protocols and architecture on society is a developing practice and is

 a body of research that is still in development.

2. Human rights threats

 Threats to the exercise of human rights on the Internet come in many

 forms. Protocols and standards may harm or enable the right to

 freedom of expression, right to freedom of information, right to non-

 discrimination, right to equal protection, right to participate in

 cultural life, arts and science, right to freedom of assembly and

 association, right to privacy, and the right to security. An end-

 user who is denied access to certain services or content may be

 unable to disclose vital information about the malpractices of a

 government or other authority. A person whose communications are

 monitored may be prevented or dissuaded from exercising their right

 to freedom of association or participate in political processes

 [Penney]. In a worst-case scenario, protocols that leak information

 can lead to physical danger. A realistic example to consider is when

 individuals perceived as threats to the state are subjected to

 torture, extra-judicial killing or detention on the basis of

 information gathered by state agencies through the monitoring of

 network traffic.

 This document presents several examples of how threats to human

 rights materialize on the Internet. Work of this nature is called “modeling”. This threat modeling is inspired

 by [RFC6973] Privacy Considerations for Internet Protocols, which is

 based on security threat analysis. This method is a work in progress

 and by no means a perfect solution for assessing human rights risks

 in Internet protocols and systems. Certain specific human rights

 threats are indirectly considered in Internet protocols as part of

 the security considerations [BCP72], but privacy considerations

 [RFC6973] or reviews, let alone human rights impact assessments of

 Protocols, are not standardized nor implemented.

 Many threats, enablers, and risks are linked to different rights.

 This is not surprising if one takes into account that human rights

 are interrelated, interdependent, and indivisible. Here, however,

 we are not discussing all human rights because not all human rights

 are relevant to Information and Communication Technologies (ICTs) in general and protocols and standards in

 particular [Bless]: "The main source of the values of human rights is

 the International Bill of Human Rights that is composed of the

 Universal Declaration of Human Rights [UDHR] along with the

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 International Covenant on Civil and Political Rights [ICCPR] and the

 International Covenant on Economic, Social and Cultural Rights

 [ICESCR]. In the light of several cases of Internet censorship, United Nations

 Human Rights Council Resolution 20/8 was adopted in 2012, affirming

 that "the same rights that people have offline must also be protected

 online." [UNHRC2016] In 2015, the Charter of Human Rights and

 Principles for the Internet [IRP] was developed and released.

 According to these documents, some examples of human rights relevant

 for ICT systems are human dignity (Art. 1 UDHR), non-discrimination

 (Art. 2), rights to life, liberty and security (Art. 3), freedom of

 opinion and expression (Art. 19), freedom of assembly and association

 (Art. 20), rights to equal protection, legal remedy, fair trial, due

 process, presumed innocent (Art. 7-11), appropriate social and

 international order (Art. 28), participation in public affairs (Art.

 21), participation in cultural life, protection of the moral and

 material interests resulting from any scientific, literary or

 artistic production of which [they are] the author (Art. 27), and

 privacy (Art. 12)." A partial catalog of human rights related to

 Information and Communications Technologies, including economic

 rights, can be found in [Hill2014].

 This is by no means an attempt to exclude specific rights or

 prioritize some rights over others.

3. Conducting human rights reviews

 Ideally, protocol developers and collaborators should incorporate

 human rights considerations into the design process itself (see

 Guidelines for human rights considerations). This section provides

 guidance on how to conduct a human rights review, i.e., gauge the

 impact or potential impact of a protocol or standard on human rights.

 Human rights reviews can take place at different stages of the

 development process of an Internet-Draft. Generally speaking, it is

 easier to influence the development of a technology at earlier stages

 than at later stages. This does not mean that reviews at last-call

 are not relevant, but they are less likely to result in significant

 changes in the reviewed document.

 Methods for analyzing technology for specific human rights impacts

 are still quite nascent. Currently, five methods have been explored

 by the Human Rights Review Team, often in conjunction with each

 other:

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3.1. Analyzing drafts based on guidelines for human rights

 considerations model

 This analysis of Internet-Drafts uses the model as described in

 section 3.3. The outlined categories and questions can be used to

 review an Internet-Draft. The advantage of this is that it provides

 a known overview, and document authors can go back to this document

 as well as [RFC8280] to understand the background and the context.

3.2. Analyzing drafts based on their perceived or speculated impact

 When reviewing an Internet-Draft, specific human rights impacts can

 become apparent by doing a close reading of the draft and seeking to

 understand how it might affect networks or society. While less

 structured than the straight use of the human rights considerations

 model, this analysis may lead to new speculative understandings of

 links between human rights and protocols.

3.3. Expert interviews

 Interviews with document authors, active members of the Working

 Group, or experts in the field can help explore the characteristics

 of the protocol and its effects. There are two main advantages to

 this approach: on the one hand, it allows the reviewer to gain a

 deeper understanding of the (intended) workings of the protocol; on

 the other hand, it also allows for the reviewer to start a discussion

 with experts or even document authors, which can help the review gain

 traction when it is published.

3.4. Interviews with impacted persons and communities

 Protocols impact users of the Internet. Interviews can help the

 reviewer understand how protocols affect the people that use the

 protocols. Since human rights are best understood from the

 perspective of the rights-holder, this approach will improve the

 understanding of the real-world effects of the technology. At the

 same time, it can be hard to attribute specific changes to a

 particular protocol, this is of course even harder when a protocol

 has not been (widely) deployed.

3.5. Tracing impacts of implementations

 The reality of deployed protocols can be at odds with the

 expectations during the protocol design and development phase

 [RFC8980]. When a specification already has associated running code,

 the code can be analyzed either in an experimental setting or on the

 Internet where its impact can be observed. In contrast to reviewing

 the draft text, this approach can allow the reviewer to understand

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 how the specifications work in practice, and potentially what

 unknown or unexpected effects the technology has.

4. Guidelines for human rights considerations

 This section provides guidance for document authors in the form of a

 questionnaire about protocols and how technical decisions can shape

 the exercise of human rights. The questionnaire may be useful at any

 point in the design process, particularly after the document authors

 have developed a high-level protocol model as described in [RFC4101].

 These guidelines do not seek to replace any existing referenced

 specifications, but rather contribute to them and look at the design

 process from a human rights perspective.

 Protocols and Internet Standards might benefit from a documented

 discussion of potential human rights risks arising from potential

 misapplications of the protocol or technology described in the RFC.

 This might be coupled with an Applicability Statement for that RFC.

 Note that the guidance provided in this section does not recommend

 specific practices. The range of protocols developed in the IETF is

 too broad to make recommendations about particular uses of data or

 how human rights might be balanced against other design goals.

 However, by carefully considering the answers to the following

 questions, document authors should be able to produce a comprehensive

 analysis that can serve as the basis for discussion on whether the

 protocol adequately takes specific human rights threats into account.

 This guidance is meant to help the thought process of a human rights

 analysis; it does not provide specific directions for how to write a

 human rights considerations section (following the example set in

 [RFC6973]).

 In considering these questions, authors will need to be aware of the

 potential of technical advances or the passage of time to undermine

 protections. In general, considerations of rights are likely to be

 more effective if they are considered given a purpose and specific

 use cases, rather than as abstract absolute goals.

 Also note that while the section uses the word, 'protocol', the

 principles identified in these questions may be applicable to other

 types of solutions (extensions to existing protocols, architecture

 for solutions to specific problems, etc.).

4.1. Connectivity

 Question(s): Does your protocol add application-specific functions to

 intermediary nodes? Could this functionality be added to end nodes

 instead of intermediary nodes?

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 Is your protocol optimized for low bandwidth and high latency

 connections? Could your protocol also be developed in a stateless

 manner?

 Explanation: The end-to-end principle [Saltzer] holds that certain

 functions can and should be performed at 'ends' of the network.

 [RFC1958] states "that in very general terms, the community believes

 that the goal is connectivity [...] and the intelligence is end to

 end rather than hidden in the network." Generally speaking, it is

 easier to attain reliability of data transmissions with computation

 at endpoints rather than at intermediary nodes.

 Also considering the fact that network quality and conditions vary

 across geography and time, it is also important to design protocols

 such that they are reliable even on low bandwidth and high latency

 connections.

 Example: Encrypting connections, like done with HTTPS, can add a

 significant network overhead and consequently make web resources less

 accessible to those with low bandwidth and/or high latency

 connections. [HTTPS-REL] Encrypting traffic is a net positive for

 privacy and security, and thus protocol designers can acknowledge the

 tradeoffs of connectivity made by such decisions.

 Impacts:

 \* Right to freedom of expression

 \* Right to freedom of assembly and association

4.2. Reliability

 Question(s): Is your protocol fault tolerant? Does it downgrade

 gracefully, i.e., with mechanisms for fallback and/or notice? Can

 your protocol resist malicious degradation attempts? Do you have a

 documented way to announce degradation? Do you have measures in

 place for recovery or partial healing from failure? Can your

 protocol maintain dependability and performance in the face of

 unanticipated changes or circumstances?

 Explanation: Reliability and resiliency ensures that a protocol will

 execute its function consistently and error resistant as described,

 and function without unexpected result. Measures for reliability in

 protocols assure users that their intended communication was

 successfully executed.

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 A system that is reliable degrades gracefully and will have a

 documented way to announce degradation. It also will have mechanisms to

 recover from failure gracefully, and if applicable, will allow for partial

 healing.

 It is important here to draw a distinction between random degradation

 and malicious degradation. Many current attacks against TLS, for

 example, exploit TLS' ability to gracefully downgrade to non-secure

 cipher suites - from a functional perspective, this is useful; from a

 security perspective, this can be disastrous. As with

 confidentiality, the growth of the Internet and fostering innovation

 in services depends on users having confidence and trust [RFC3724] in

 the network. For reliability, it is necessary that services notify

 the users if a delivery fails. In the case of real-time systems in

 addition to the reliable delivery, the protocol needs to safeguard

 timeliness.

 Example: In the modern IP stack structure, a reliable transport layer

 requires an indication that transport processing has successfully

 completed, such as given by TCP's ACK message [RFC0793], and not

 simply an indication from the Internet Protocol (IP) layer that the packet arrived.

 Similarly, an application layer protocol may require an application-

 specific acknowledgment that contains, among other things, a status

 code indicating the disposition of the request (See [RFC3724]).

 Impacts:

 \* Right to freedom of expression

 \* Right to security

4.3. Content agnosticism

 Question(s): If your protocol impacts packet handling, does it use

 user data (packet data that is not included in the header)? Is it

 making decisions based on the payload of the packet? Does your

 protocol prioritize certain content or services over others in the

 routing process? Is the protocol transparent about the

 prioritization that is made (if any)?

 Explanation: Content agnosticism refers to the notion that network

 traffic is treated identically regardless of payload, with some

 exceptions where it comes to effective traffic handling, for instance

 where it comes to delay-tolerant or delay-sensitive packets, based on

 the header. If there is any prioritization based on the content or

 metadata of the protocol, the protocol should be transparent about

 such information and reasons thereof.

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 Example: Content agnosticism prevents payload-based discrimination

 against packets. This is important because changes to this principle

 can lead to a two-tiered Internet, where certain packets are

 prioritized over others on the basis of their content. Effectively

 this would mean that although all users are entitled to receive their

 packets at a certain speed, some users become more equal than others.

 Impacts:

 \* Right to freedom of expression

 \* Right to non-discrimination

 \* Right to equal protection

4.4. Localization

 Question(s): Does your protocol uphold the standards of

 internationalization? Have you made any concrete steps towards

 localizing your protocol for relevant audiences?

 Explanation: Localization refers to the adaptation of a product,

 application or document content to meet the language, cultural and

 other requirements of a specific target market (a locale)

 [W3Ci18nDef]. For our purposes, it can be described as the practice

 of translating an implementation to make it functional in a specific

 language or for users in a specific locale (see

 Internationalization).

 Example: The Internet is a global medium, but many of its protocols

 and products are developed with a certain audience in mind, that

 often share particular characteristics like knowing how to read and

 write in ASCII and knowing English. This limits the ability of a

 large part of the world's online population from using the Internet

 in a way that is culturally and linguistically accessible. An

 example of a protocol that has taken into account the view that

 individuals like to have access to data in their native language can

 be found in [RFC5646]. This protocol labels the information content

 with an identifier for the language in which it is written. And this

 allows information to be presented in more than one language.

 Impacts:

 \* Right to non-discrimination

 \* Right to participate in cultural life, arts and science

 \* Right to freedom of expression

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4.5. Internationalization

 Question(s): Does your protocol or specification define text string

 elements, in the payload or headers, that have to be understood or

 entered by humans? Does your specification allow Unicode? If so, do

 you accept texts in one charset (which must be UTF-8), or several

 (which is dangerous for interoperability)? If character sets or

 encodings other than UTF-8 are allowed, does your specification

 mandate a proper tagging of the charset? Did you have a look at

 [RFC6365]?

 Explanation: Internationalization refers to the practice of making

 protocols, standards, and implementations usable in different

 languages and scripts (see Localization). In the IETF,

 internationalization means to add or improve the handling of non-

 ASCII text in a protocol. [RFC6365] A different perspective, more

 appropriate to protocols that are designed for global use from the

 beginning, is the definition used by W3C:

 "Internationalization is the design and development of a

 product, application or document content that enables easy

 localization for target audiences that vary in culture, region,

 or language." {{W3Ci18nDef}}

 Many protocols that handle text only handle one charset (US-ASCII),

 or leave the question of what coded character set and encoding are

 used up to local guesswork (which leads, of course, to

 interoperability problems). If multiple charsets are permitted, they

 must be explicitly identified [RFC2277]. Adding non-ASCII text to a

 protocol allows the protocol to handle more scripts, hopefully

 representing users across the world. In today's world, that is

 normally best accomplished by allowing Unicode encoded in UTF-8 only.

 In the current IETF policy [RFC2277], internationalization is aimed

 at user-facing strings, not protocol elements, such as the verbs used

 by some text-based protocols. (Do note that some strings are both

 content and protocol elements, such as identifiers.) Given the

 IETF's mission to make the Internet a global network of networks,

 [RFC3935] developers should ensure that protocols work with languages

 apart from English and character sets apart from Latin characters.

 It is therefore crucial that at the very least, the content carried

 by the protocol can be in any script, and that all scripts are

 treated equally.

 Example: See localization

 Impacts:

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 \* Right to freedom of expression

 \* Right to political participation

 \* Right to participate in cultural life, arts and science

4.6. Open Standards

 Question(s): Is your protocol fully documented in a way that it could

 be easily implemented, improved, built upon and/or further developed?

 Do you depend on proprietary code for the implementation, running or

 further development of your protocol? Does your protocol favor a

 particular proprietary specification over technically-equivalent

 competing specification(s), for instance by making any incorporated

 vendor specification "required" or "recommended" [RFC2026]? Do you

 normatively reference another standard that is not available without

 cost (and could you do without it)? Are you aware of any patents

 that would prevent your standard from being fully implemented

 [RFC8179] [RFC6701]?

 Explanation: The Internet was able to be developed into the global

 network of networks because of the existence of open, non-proprietary

 standards [Zittrain]. They are crucial for enabling

 interoperability. Yet, open standards are not explicitly defined

 within the IETF. On the subject, [RFC2026] states: "Various national

 and international standards bodies, such as ANSI, ISO, IEEE, and ITU-

 T, develop a variety of protocol and service specifications that are

 similar to Technical Specifications defined at the IETF. National

 and international groups also publish "implementors' agreements" that

 are analogous to Applicability Statements, capturing a body of

 implementation-specific detail concerned with the practical

 application of their standards. All of these are considered to be

 "open external standards" for the purposes of the Internet Standards

 Process." Similarly, [RFC3935] does not define open standards but

 does emphasize the importance of an "open process", i.e., "any

 interested person can participate in the work, know what is being

 decided, and make his or her voice heard on the issue."

 Open standards (and open-source software) allow users to glean

 information about how the tools they are using work, including the

 tools' security and privacy properties. They additionally allow for

 permissionless innovation, which is important to maintain the freedom

 and ability to freely create and deploy new protocols on top of the

 communications constructs that currently exist. It is at the heart

 of the Internet as we know it, and to maintain its fundamentally open

 nature, we need to be mindful of the need for developing open

 standards.

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 All standards that need to be normatively implemented should be

 freely available and with reasonable protection for patent

 infringement claims, so it can also be implemented in open source or

 free software. Patents have often held back open standardization or

 been used against those deploying open standards, particularly in the

 domain of cryptography [newegg]. An exemption of this is sometimes

 made when a protocol is standardized that normatively relies on

 specifications produced by others Standards Development Organizations (SDOs) that are not freely available.

 Patents in open standards or in normative references to other

 standards should have a patent disclosure [notewell], royalty-free

 licensing [patentpolicy], or some other form of fair, reasonable and

 non-discriminatory terms.

 Example: [RFC6108] describes a system for providing critical end-user

 notifications to web browsers, which has been deployed by Comcast, an

 Internet Service Provider (ISP). Such a notification system is being

 used to provide near-immediate notifications to customers, such as to

 warn them that their traffic exhibits patterns that are indicative of

 malware or virus infection. There are other proprietary systems that

 can perform such notifications, but those systems utilize Deep Packet

 Inspection (DPI) technology. In contrast, that document describes a

 system that does not rely upon DPI, and is instead based on open IETF

 standards and open-source applications.

 Impacts:

 \* Right to freedom of expression

 \* Right to participate in cultural life, arts and science

4.7. Heterogeneity Support

 Question(s): Does your protocol support heterogeneity by design?

 Does your protocol allow for multiple types of hardware? Does your

 protocol allow for multiple types of application protocols? Is your

 protocol liberal in what it receives and handles? Will it remain

 usable and open if the context changes?

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 Explanation: The Internet is characterized by heterogeneity on many

 levels: devices and nodes, router scheduling algorithms and queue

 management mechanisms, routing protocols, levels of multiplexing,

 protocol versions and implementations, underlying link layers (e.g.,

 point-to-point, multi-access links, wireless, FDDI, etc.), in the

 traffic mix and in the levels of congestion at different times and

 places. Moreover, as the Internet is composed of autonomous

 organizations and Internet service providers, each with their own

 separate policy concerns, there is a large heterogeneity of

 administrative domains and pricing structures. As a result, the

 heterogeneity principle proposed in [RFC1958] needs to be supported

 by design [FIArch].

 Heterogeneity support in protocols can thus enable a wide range of

 devices and (by extension) users to participate on the network.

 Example: Heterogeneity is inevitable and needs be supported by

 design. Multiple types of hardware must be allowed for, e.g.,

 transmission speeds differing by at least 7 orders of magnitude,

 various computer word lengths, and hosts ranging from memory-starved

 microprocessors up to massively parallel supercomputers. Multiple

 types of application protocols must be allowed for, ranging from the

 simplest such as remote login up to the most complex such as commit

 protocols for distributed databases. [RFC1958].

 Impacts:

 \* Right to freedom of expression

 \* Right to political participation

4.8. Integrity

 Question(s): Does your protocol maintain, assure and/or verify the

 accuracy of payload data? Does your protocol maintain and assure the

 consistency of data? Does your protocol in any way allow for the

 data to be (intentionally or unintentionally) altered?

 Explanation: Integrity refers to the maintenance and assurance of the

 accuracy and consistency of data to ensure it has not been

 (intentionally or unintentionally) altered.

 Example: Integrity verification of data is important to prevent

 vulnerabilities and attacks from on-path attackers. These attacks

 happen when a third party (often for malicious reasons) intercepts a

 communication between two parties, inserting themselves in the middle

 changing the content of the data. In practice this looks as follows:

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 Alice wants to communicate with Bob. Corinne forges and sends a

 message to Bob, impersonating Alice. Bob cannot see that the data from

 Alice was altered by Corinne. Corinne intercepts and alters the

 communication as it is sent between Alice and Bob. Corinne is able

 to control the communication content.

 Impacts:

 \* Right to freedom of expression

 \* Right to security

4.9. Authenticity

 Question(s): Do you have sufficient measures to confirm the truth of

 an attribute of a single piece of data or entity? Can the attributes

 get garbled along the way (see security)? If relevant, have you

 implemented IPsec, DNSsec, HTTPS and other Standard Security Best

 Practices?

 Explanation: Authenticity ensures that data does indeed come from the

 source it claims to come from. This is important to prevent certain

 attacks or unauthorized access and use of data.

 At the same time, authentication should not be used as a way to

 prevent heterogeneity support, as is often done for vendor lock-in or

 digital rights management.

 Example: Authentication of data is important to prevent

 vulnerabilities, and attacks from on-path attackers. These attacks

 happen when a third party (often for malicious reasons) intercepts a

 communication between two parties, inserting themselves in the middle

 and posing as both parties. In practice this looks as follows:

 Alice wants to communicate with Bob. Alice sends data to Bob.

 Corinne intercepts the data sent to Bob. Corinne reads (and

 potentially alters) the message to Bob. Bob cannot see that the data did

 not come from Alice but from Corinne.

 When there is proper authentication the scenario would be as follows:

 Alice wants to communicate with Bob. Alice sends data to Bob.

 Corinne intercepts the data sent to Bob. Corinne reads and alters

 the message to Bob. Bob can see that the data did not come from Alice.

 Impacts:

 \* Right to privacy

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 \* Right to freedom of expression

 \* Right to security

4.10. Confidentiality

 Question(s): Does this protocol expose the transmitted data over the

 wire? Does the protocol expose information related to identifiers or

 data? If so, does it do so to each other protocol entity (i.e.,

 recipients, intermediaries, and enablers) [RFC6973]? What options

 exist for protocol implementers to choose to limit the information

 shared with each entity? What operational controls are available to

 limit the information shared with each entity?

 What controls or consent mechanisms does the protocol define or

 require before personal data or identifiers are shared or exposed via

 the protocol? If no such mechanisms or controls are specified, is it

 expected that control and consent will be handled outside of the

 protocol?

 Does the protocol provide ways for initiators to share different

 pieces of information with different recipients? If not, are there

 mechanisms that exist outside of the protocol to provide initiators

 with such control?

 Does the protocol provide ways for initiators to limit the sharing or

 express individuals' preferences to recipients or intermediaries with

 regard to the collection, use, or disclosure of their personal data?

 If not, are there mechanisms that exist outside of the protocol to

 provide users with such control? Is it expected that users will have

 relationships that govern the use of the information (contractual or

 otherwise) with those who operate these intermediaries? Does the

 protocol prefer encryption over clear text operation?

 Explanation: Confidentiality refers to keeping your data secret from

 unintended listeners [BCP72]. The growth of the Internet depends on

 users having confidence that the network protects their personal data

 [RFC1984]. The possibility of pervasive monitoring and surveillance

 undermines users' trust, and can be mitigated by ensuring

 confidentiality, i.e., passive attackers should gain little or no

 information from observation or inference of protocol activity.

 [RFC7258][RFC7624].

 Example: Protocols that do not encrypt their payload make the entire

 content of the communication available to the idealized attacker

 along their path. Following the advice in [RFC3365], most such

 protocols have a secure variant that encrypts the payload for

 confidentiality, and these secure variants are seeing ever-wider

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 deployment. A noteworthy exception is DNS [RFC1035], as DNSSEC

 [RFC4033] does not have confidentiality as a requirement. This

 implies that, in the absence of the use of more recent standards like

 DNS over TLS [RFC7858] or DNS over HTTPS [RFC8484], all DNS queries

 and answers generated by the activities of any protocol are available

 to the attacker. When store-and-forward protocols are used (e.g.,

 SMTP [RFC5321]), intermediaries leave this data subject to

 observation by an attacker that has compromised these intermediaries,

 unless the data is encrypted end-to-end by the application-layer

 protocol or the implementation uses an encrypted store for this data

 [RFC7624].

 Impacts:

 \* Right to privacy

 \* Right to security

4.11. Security

 Question(s): Did you have a look at Guidelines for Writing RFC Text

 on Security Considerations [BCP72]? Have you found any attacks that

 are somewhat related to your protocol/specification, yet considered

 out of scope of your document? Would these attacks be pertinent to

 the human rights enabling features of the Internet (as described

 throughout this document)?

 Explanation: Security is not a single monolithic property of a

 protocol or system, but rather a series of related but somewhat

 independent properties. Not all of these properties are required for

 every application. Since communications are carried out by systems

 and access to systems is through communications channels, security

 goals obviously interlock, but they can also be independently

 provided. [BCP72].

 Typically, any protocol operating on the internet can be the target

 of passive attacks (when the attacker can access and read packets on

 the network); active attacks (when an attacker is capable of writing

 information to the network packets). [BCP72]

 Example: See [BCP72].

 Impacts:

 \* Right to freedom of expression

 \* Right to freedom of assembly and association

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 \* Right to non-discrimination

 \* Right to security

4.12. Privacy

 Question(s): Did you have a look at the Guidelines in the Privacy

 Considerations for Internet Protocols [RFC6973] section 7? Does your

 protocol maintain the confidentiality of metadata? Could your

 protocol counter traffic analysis? Does your protocol adhere to data

 minimization principles? Does your document identify potentially

 sensitive data logged by your protocol and/or for how long that needs

 to be retained for technical reasons?

 Explanation: Privacy refers to the right of an entity (normally a

 person), acting on its own behalf, to determine the degree to which

 it will interact with its environment, including the degree to which

 the entity is willing to share its personal information with others.

 [RFC4949]. If a protocol provides insufficient privacy protection it

 may have a negative impact on freedom of expression as users self-

 censor for fear of surveillance, or find themselves unable to express

 themselves freely.

 Example: See [RFC6973]

 Impacts:

 \* Right to freedom of expression

 \* Right to non-discrimination

4.13. Pseudonymity

 Question(s): Does the protocol collect personally derived data? Does

 the protocol generate or process anything that can be, or be tightly

 correlated with, personally identifiable information? Does the

 protocol utilize data that is personally-derived, i.e., derived from

 the interaction of a single person, or their device or address? If

 yes, can the protocol be implemented in a way that does not rely on

 personally identifiable information? If not, does the specification

 describe how any such data be handled? Have you considered the

 Privacy Considerations for Internet Protocols [RFC6973], especially

 section 6.1.2?

 Explanation: Pseudonymity means using a pseudonym instead of one's

 "real" name. There are many reasons for users to use pseudonyms, for

 instance to: hide their gender, protect themselves against

 harassment, protect their families' privacy, frankly discuss

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 sexuality, or develop an artistic or journalistic persona without

 repercussions from an employer, (potential) customers, or social

 surrounding. [geekfeminism] The difference between anonymity and

 pseudonymity is that a pseudonym often is persistent. "Pseudonymity

 is strengthened when less personal data can be linked to the

 pseudonym; when the same pseudonym is used less often and across

 fewer contexts; and when independently chosen pseudonyms are more

 frequently used for new actions (making them, from an observer's or

 attacker's perspective, unlinkable)." [RFC6973]

 Pseudonymity - the ability to use a persistent identifier not linked

 to one's offline identity - is an important feature for many end-

 users, as it allows them different degrees of disguised identity and

 privacy online. This can allow an enabling environment for users to

 exercise other rights, including freedom of expression and political

 participation, without fear or direct identification or

 discrimination.

 Example: Generally, pseudonymous identifiers cannot be simply reverse

 engineered. Some early approaches took approaches such as simple

 hashing of IP addresses, but these could then be simply reversed by

 generating a hash for each potential IP address and comparing it to

 the pseudonym.

 Example: There are also efforts for application layer protocols, like

 Oblivious DNS Over HTTPS, [draft-pauly-dprive-oblivious-doh] that can

 separate identifiers from requests.

 Impacts:

 \* Right to non-discrimination

 \* Right to freedom of expression

 \* Right to political participation

 \* Right to freedom of assembly and association

4.14. Anonymity

 Question(s): Does your protocol make use of persistent identifiers?

 Can it be done without them? Did you have a look at the Privacy

 Considerations for Internet Protocols [RFC6973], especially section

 6.1.1 of that document?

 Explanation: Anonymity refers to the condition of an identity being

 unknown or concealed [RFC4949]. Even though full anonymity is hard

 to achieve, it is a non-binary concept. Making pervasive monitoring

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 and tracking harder is important for many users as well as for the

 IETF [RFC7258]. Achieving a higher level of anonymity is an

 important feature for many end-users, as it allows them different

 degrees of privacy online. Anonymity is an inherent part of the

 right to freedom of opinion and expression and the right to privacy.

 Avoid adding identifiers, options or configurations that create or

 might lead to patterns or regularities that are not explicitly

 required by the protocol.

 If your protocol collects data and seeks to distribute it to more

 entities than the originally-intended recipients (see [RFC6235] as

 an example), you should anonymize the data, but keep in mind that

 "anonymizing" data is notoriously hard. For example, just dropping

 the last byte of an IP address does not "anonymize" data.

 If your protocol allows for identity management, there should be a

 clear barrier between the identities to ensure that they cannot

 (easily) be associated with each other.

 A protocol that uses data that could help identify a sender (items of

 interest) should be protected from third parties. For instance, if

 one wants to hide the source/destination IP addresses of a packet,

 the use of IPsec in tunneling mode (e.g., inside a virtual private

 network) can be helpful to protect from third parties likely to

 eavesdrop packets exchanged between the tunnel endpoints.

 Example: An example is DHCP where sending a persistent identifier as

 the client name was not mandatory but, in practice, done by many

 implementations, before [RFC7844].

 Impacts:

 \* Right to non-discrimination

 \* Right to political participation

 \* Right to freedom of assembly and association

 \* Right to security

4.15. Censorship resistance

 Question(s): Can your protocol contribute to filtering? Could your protocol be

 implemented to censor data or services? Could it be designed to

 ensure this doesn't happen? Does your protocol make it apparent or

 transparent when access to a resource is restricted and the reasons why it is restricted

 ? Does your protocol introduce new identifiers or re-use

 existing identifiers (e.g., MAC addresses) that might be associated

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 with persons or content?

 Explanation: Governments and service providers block or filter

 content or traffic, often without the knowledge of end-users.

 [RFC7754] See [draft-irtf-pearg-censorship] for a survey of

 censorship techniques employed across the world, which lays out

 protocol properties that have been exploited to censor access to

 information. Censorship resistance refers to the methods and

 measures to prevent Internet censorship.

 Example: Identifiers of content exposed within a protocol might be

 used to facilitate censorship, as in the case of Application Layer

 based censorship, which affects protocols like HTTP. In HTTP, denial

 or restriction of access can be made apparent by the use of status

 code 451, which allows server operators to operate with greater

 transparency in circumstances where issues of law or public policy

 affect their operation [RFC7725].

 If a protocol potentially enables censorship, protocol designers

 should strive towards creating error codes that capture different

 scenarios (blocked due to administrative policy, unavailable because

 of legal requirements, etc.) to minimize ambiguity for end-users.

 In the development of the IPv6 protocol, it was discussed to embed a

 Media Access Control (MAC) address into unique IP addresses. This

 would make it possible for eavesdroppers and other information

 collectors to identify when different addresses used in different

 transactions actually correspond to the same node. This is why

 standardisation efforts like Privacy Extensions for Stateless Address

 Autoconfiguration in IPv6 [RFC4941] and MAC address randomization

 [draft-zuniga-mac-address-randomization] have been pursued.

 Impacts:

 \* Right to freedom of expression

 \* Right to political participation

 \* Right to participate in cultural life, arts, and science

 \* Right to freedom of assembly and association

4.16. Outcome Transparency

 Question(s): Are the effects of your protocol fully and easily

 comprehensible, including with respect to unintended consequences of

 protocol choices?

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 Explanation: Certain technical choices may have unintended

 consequences.

 Example: Lack of authenticity may lead to lack of integrity and

 negative externalities, of which spam is an example. Lack of data

 that could be used for billing and accounting can lead to so-called

 "free" arrangements which obscure the actual costs and distribution

 of the costs, for example the barter arrangements that are commonly

 used for Internet interconnection; and the commercial exploitation of

 personal data for targeted advertising which is the most common

 funding model for the so-called "free" services such as search

 engines and social networks. Other unexpected outcomes might not be

 technical, but rather architectural, social or economic.

 Impacts:

 \* Right to freedom of expression

 \* Right to privacy

 \* Right to freedom of assembly and association

 \* Right to access to information

4.17. Adaptability

 Question(s): Is your protocol written in such a way that it would be

 easy for other protocols to be developed on top of it, or to interact

 with it? Does your protocol impact permissionless innovation? (See

 Open Standards)

 Explanation: Adaptability is closely interrelated with permissionless

 innovation: both maintain the freedom and ability to freely create

 and deploy new protocols on top of the communications constructs that

 currently exist. It is at the heart of the Internet as we know it,

 and to maintain its fundamentally open nature, we need to be mindful

 of the impact of protocols on maintaining or reducing permissionless

 innovation to ensure the Internet can continue to develop.

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 Adaptability and permissionless innovation can be used to shape

 information networks as preferenced by groups of users. Furthermore,

 a precondition of adaptability is the ability of the people who can

 adapt the network to be able to know and understand the network.

 This is why adaptability and permissionless innovation are inherently

 connected to the right to education and the right to science as well

 as the right to freedom of assembly and association as well as the

 right to freedom of expression. Since it allows the users of the

 network to determine how to assemble, collaborate, and express

 themselves.

 Example: WebRTC generates audio and/or video data. In order to

 ensure that WebRTC can be used in different locations by different

 parties, it is important that standard Javascript APIs are developed

 to support applications from different voice service providers.

 Multiple parties will have similar capabilities, in order to ensure

 that all parties can build upon existing standards these need to be

 adaptable, and allow for permissionless innovation.

 Impacts:

 \* Right to education

 \* Right to science

 \* Right to freedom of expression

 \* Right to freedom of assembly and association

4.18. Accessibility

 Question(s): Is your protocol designed to provide an enabling

 environment for all? Have you looked at the W3C Web Accessibility

 Initiative for examples and guidance?

 Explanation: Sometimes in the design of protocols, websites, web

 technologies, or web tools, barriers are created that exclude people

 from using the Web. The Internet should be designed to work for all

 people, whatever their hardware, software, language, culture,

 location, or physical or mental ability. When the Internet

 technologies meet this goal, it will be accessible to people with a

 diverse range of hearing, movement, sight, and cognitive ability.

 [W3CAccessibility]

 Example: The HTML protocol as defined in [HTML5] specifically

 requires that every image must have an alt attribute (with a few

 exceptions) to ensure images are accessible for people that cannot

 themselves decipher non-text content in web pages.

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 Another example is the work that is done in the AVT and AVTCORE

 working groups in the IETF that enable text conversation in

 multimedia, text telephony, wireless multimedia and video

 communications for sign language and lip-reading (i.e.. [RFC9071]).

 Impacts:

 \* Right to non-discrimination

 \* Right to freedom of assembly and association

 \* Right to education

 \* Right to political participation

4.19. Decentralization

 Question(s): Can your protocol be implemented without a single point

 of control? If applicable, can your protocol be deployed in a

 federated manner? Does your protocol create additional centralized

 points of control?

 Explanation: Decentralization is one of the central technical

 concepts of the architecture of the Internet, and is embraced as such

 by the IETF [RFC3935]. It refers to the absence or minimization of

 centralized points of control, a feature that is assumed to make it

 easy for new users to join and new uses to unfold [Brown]. It also

 reduces issues surrounding single points of failure, and distributes

 the network such that it continues to function even if one or several

 nodes are disabled. With the commercialization of the Internet in

 the early 1990s, there has been a slow move away from

 decentralization, to the detriment of the technical benefits of

 having a decentralized Internet. For a more detailed discussion of

 this topic, please see [arkkoetal].

 Example: The bits traveling the Internet are increasingly susceptible

 to monitoring and censorship, from both governments and Internet

 service providers, as well as third (malicious) parties. The ability

 to monitor and censor is further enabled by the increased

 centralization of the network that creates central infrastructure

 points that can be tapped into. The creation of peer-to-peer

 networks and the development of voice-over-IP (VoIP) protocols using peer-

 to-peer technology in combination with distributed hash table (DHT)

 for scalability are examples of how protocols can preserve

 decentralization [Pouwelse].

 Impacts:

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 \* Right to freedom of expression

 \* Right to freedom of assembly and association

4.20. Remedy

 Question(s): Can your protocol facilitate a negatively impacted

 party's right to remedy without disproportionately impacting other

 parties' human rights, especially their right to privacy?

 Explanation: Providing access to remedy by states and corporations is

 a part of the UN Guiding Principles on Business and Human Rights

 [UNGP]. Access to remedy may help victims of human rights violations

 in seeking justice, or allow law enforcement agencies to identify a

 possible violator. However, mechanisms in protocols that try to

 enable 'attribution' to individuals will impede the exercise of the

 right to privacy. The former Special Rapporteur for Freedom of

 Expression has also argued that anonymity is an inherent part of

 freedom of expression [Kaye]. Considering the potential adverse

 impact of attribution on the right to privacy and freedom of

 expression, enabling attribution on an individual level is most

 likely not consistent with human rights.

 Example: Adding personally identifiable information (PII) to data streams

 might help in identifying a violator of human rights and provide

 access to remedy, but this would disproportionally affect all users’

 right to privacy, anonymous expression, and association.

 Impacts:

 \* Right to remedy

 \* Right to security

 \* Right to privacy

4.21. Misc. considerations

 Question(s): Have you considered potential negative consequences

 (individual or societal) that your protocol or document might have?

 Explanation: Publication of a particular RFC under a certain status

 has consequences. Publication as an Internet Standard as part of the

 Standards Track may signal to implementers that the specification has

 a certain level of maturity, operational experience, and consensus.

 Similarly, publication of a specification of an experimental document as

 part of the non-standards track would signal to the community that

 the document "may be intended for eventual standardization but [may]

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 not yet [be] ready" for wide deployment. The extent of the

 deployment, and consequently its overall impact on end-users, may

 depend on the document status presented in the RFC. See [BCP9] and

 updates to it for a fuller explanation.

5. Document Status

 This RG document currently documents best practices and

 guidelines for human rights reviews of network protocols,

 architectures and other Internet-Drafts and RFCs.

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 Shivan Kaul Sahib.

7. Security Considerations

 Article three of the Universal Declaration of Human Rights reads:

 "Everyone has the right to life, liberty and security of person.".

 This article underlines the importance of security and its

 interrelation with human life and liberty, but since human rights are

 indivisible, interrelated and interdependent, security is also

 closely linked to other human rights and freedoms. This document

 seeks to strengthen human rights, freedoms, and security by relating

 and translating these concepts to concepts and practices as they are

 used in Internet protocol and architecture development. The aim of

 this is to secure human rights and thereby improve the sustainability,

 usability, and effectiveness of the network. The document seeks to

 achieve this by providing guidelines as done in section three of this

 document.

8. IANA Considerations

 This document has no actions for IANA.

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9. 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

 (mailto:hrpc@ietf.org). Information on the group and information on

 how to subscribe to the list is at

 https://www.irtf.org/mailman/listinfo/hrpc

 (https://www.irtf.org/mailman/listinfo/hrpc)

 Archives of the list can be found at: https://www.irtf.org/mail-

 archive/web/hrpc/current/index.html (https://www.irtf.org/mail-

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