

CASE STUDY: IETF

Draft 2009-05-05 (Mattias Ganslandt, Jonas Andreasson and Martin Sutinen)

Work in progress, comments most welcome!

Brief facts about IETF

Webpage

www.ietf.org

Organization tagline

IETF is developing internet standards and is distinguished by its uncommon organizational form

Main standardization areas

Internet standards

Best known standards

[TCP/IP](#)

Organization classification

Non-formal, individual based with a semi-specific target area

Does the SSO have any explicit or implicit policy relating to interoperability?

IETF requires that there exist independent and interoperable implementations of a standard in order to advance it to higher standard levels. The IETF mission statement also recognizes the merits of interoperability.

Is there an explicit strategy to facilitate or contribute to interoperability?

The requirement of interoperable implementations is absolute. IETF also provides some documents, like [BCP 22](#), which serve as a guideline for achieving interoperability. IETF does not do interoperability testing themselves or supply testing suites.

Procedures for testing of a proposed/developed standard with respect to interoperability and backward compatibility?

Testing is not done by IETF but is provided by members in the working groups and companies.

What are the procedures (internal or external) for implementation?

The IETF are not responsible for implementations, this lies with the vendors. IETF does issue Applicability Statements which can serve as implementation guidelines. Reference implementations can also serve as an implementation guideline.

How is compliance enforced and what are the consequences of defections and deviations from the standard?

IETF does not enforce compliance. Deviations would supposedly either be punished by the market or in the result of malfunctioning products.

Did the SSO develop competing standards for the same or similar type of technical problem?
IETF is currently [developing a Network Access Control standard](#). There are already three established (proprietary) standards within this area, [Cisco NAC](#), [Microsoft NAP](#) and [Trusted Computing Group TNC](#).

What is the value of interoperability in the specific area in which the SSO is active?
Interoperability is crucial since the operation of the internet is at risk with non-interoperable standards.

What is the value of selection and conformity in the specific area in which the SSO is active?
Selection and conformity are important.

Standardization Process

- The Internet Engineering Task Force (IETF) has existed since 1986.
- IETF produce standards relevant to the internet. Currently there are close to 70 fully approved IETF standards.
- IETF does not have an official membership, any individual is invited to participate free of charge. Organizations can only partake through representation by employees.
- There are no limitations disallowing people to participate in work groups. However, IETF is a meritocratic organization where experience and merit will give weight to proposals. There is no voting procedure. Instead, the Area Director of a given technical area will conclude when there is “rough consensus” (substantial support and no major objections) and then submit the standard to the [Internet Engineering Steering Group \(IESG\)](#) for official approval. All decisions can be appealed.
- All standards, working materials and meeting minutes are publicly available online.
- Participants are free to discuss new topics and if a general interest is sparked they can set up a new work item as an [“internet-draft”](#). The formation of a working group requires the approval of the relevant Area Director. The official startup of a new WG usually is preceded by a “Birds of a Feather” (BOF) meeting.

Improvement activities

- There are currently discussions within the IETF on how IPR should be handled, specifically late or failure of disclosure of IPR in contributions. No amendments to current practices have been proposed so far.
- The only part of the development process which is not subject to public participation and review is the decision by IESG to approve a standard or not.
- The simple goal the IETF is to make the internet work better. The guiding principles are: open process, technical competence, volunteer core, protocol ownership and rough consensus and running code.
- IETF activities overlap with those of [ECMA](#), [ETSI](#), [IEEE](#), [ISO](#), [ITU](#) and [W3C](#). IETF cooperates with [IEC](#), IEEE, ISO, ITU, OASIS and W3C and have formal liaisons with ISO, [ISOC](#), ITU and W3C.

Interoperability

- The IETF does not have a definite stance on IPR. No requirement of royalty-free IPR is required other than for security issues although royalty-free licenses are generally encouraged. For other contributions the intent is to develop standards with RAND IPR attached. This is not controlled in fact, neither is it required, but the existence of two independent and interoperable standards is deemed to indicate existence of RAND terms. Copyright is granted to IETF and ISOC on royalty free terms with the right to produce derivatives, however, the original contributors retain copyright of their submissions. Contributions to RFCs are owned by the IETF.
- All participants are requested to disclose known IPRs. Disclosures are encouraged to indicate whether the IPR will be made available under royalty-free, RAND or other terms.
- IETF issues Applicability Statements, which can help users to implement and understand the standard in question. The reference implementations required for evolving the standards to higher levels can also serve as implementation guidelines. IETF does not provide testing, validation or certification for their developed standards.
- IETF standards are produced to facilitate interoperability over the internet. Each standard that is officially published as an IETF standard have to demonstrate (at least) two independent and interoperable implementations.

Case study

The Internet Engineering Task Force (IETF) is an open global community officially founded in 1986 which develops and promotes Internet standards. The Internet is a complex global network, the existence of which has been made possible through several international treaties as well as through technical specifications and protocols which describe how data is exchanged between all the local networks which together form the Internet, which were largely developed by the IETF.

In 1992 the non-profit organization The Internet Society (ISOC) was formed with the ambition to head the open development of the Internet. Since that time IETF is a part of the umbrella organization ISOC.

IETF is significantly different from other standards development organizations. It is a community of individuals rather than a formal organization, something of an open forum. No formal membership exists and anyone can participate in it. All work is conducted by individuals on a voluntary basis. That being said, most members are sponsored by or employed by a company or another organization. The technical work of IETF is done within working groups, of which there are about 115 at the moment. These are grouped into eight different fields or areas, which are managed by one or several Area Directors. The Area Directors and the chairman of the IETF constitute the Internet Engineering Steering Group (IESG). Appointments for these positions are made on a two-year basis by a nomination committee, the chair of which in turn is appointed by the ISOC. Such appointments are based on the merits of the participants and IETF can be described as a meritocracy.

The development of a standard starts with the development of an Internet-Draft by a working group or an individual. It should further be clarified that a working group within IETF is by no means such a formal

group as there might be in other standard development organizations. A working group can rather be described as the individuals which sign up on a mailing list open to anyone, a forum where suggestions and specifications for an Internet-Draft is discussed. The Internet-Draft is then published publicly for review and comments. Once revised based on the comments, the Internet-Draft is taken through the Area Director to the IESG. The IESG then conducts a final review of the draft, including a Last-Call for comments from the public, before the draft is published as a standard. Publishing is done by inserting the standard in the document series RFC, Request for Comments, which has existed since 1969. However, many types of specifications are published in the RFC-series, and there are three different levels of IETF standards. While there is an ambition to reach consensus in the development of a new standard there is no formal voting as in most other standards development organizations. It is in fact very possible for the IESG to approve a standard for which there is no consensus in the IETF. This however should be viewed in the light that IETF is a very technocratic organization where ideas are judged on technical merit rather than whether companies support it or not. On the other hand, IETF is also an organization where appeals can be made not only based on the procedure of a decision, but also on technical specifications. Such appeals are first made to the IESG and if necessary escalated to the [Internet Architecture Board](#), another organization within the ISOC which has existed since 1979 and is tasked to define the overall structure of the Internet and oversee the IETF.

IETF are committed to support their standards until they are removed from the public domain. Removal is done by the IESG which, after a review including a Last-Call, change the status of the document in the RFC to historical. Any revision of a standard is done through the same process as the development of a new standard. As can be expected given the structure of the organization, IETF does not conduct any certification or validation of implementations based on IETF standards. However, Applicability Statements are published to provide users with information on how a standard is intended to be applied. Additionally, for a standard to be published with either of the two higher status levels briefly mentioned above, at least two independent and interoperable implementations have to exist.

In line with the philosophy of the IETF about open access and that anyone should be able to contribute to the development of a standard all documents are made publicly available, including for example preliminary work, meeting minutes and the material on the mailing lists. The intent of the IETF is to contribute with positive value for the Internet community. All participants have to grant IETF and ISOC the right to publish all contributions under royalty-free terms.

To gain wide acceptance of the developed standards, the IETF has preferred technologies which are not subject to third party IPR. But with the strong technological focus within the organization, it is also possible for the organization to publish standards which require patented technologies if they are considered superior, even in cases where such technologies have not been made available on licenses under RAND-terms.

Anyone participating in the development of a standard is requested to disclose IPR that may apply but IETF clearly state in each standard document that IETF accept no responsibility in the IPR area. There is, however, one exception from this general IPR policy. In areas where essential security technology is

required for implementation of the standard, IETF demands that at least one such security solution is available under royalty-free terms, otherwise the standard cannot be passed.

It has happened though that patent holders have chosen to freely allow their technologies to be used in implementations of IETF standards. With basically all of the world's foremost network experts participating in the IETF, such a decision generates substantial goodwill.

Despite the informal structure of the IETF it is a standards developing organization which is fundamental for the structure of the Internet and hence of great importance. IETF also cooperate with various other organizations such as the ISO, IEC and ITU, where cross references to standards from the other organizations is done. Likewise, IETF continually exchange information with organizations such as W3C and OASIS, since the IETF standards is a foundation for the standards developed by these groups.

Key success factors

- Participant are highly skilled individuals which guarantees technical excellence in standards
- The altruistic mission of IETF is compelling and can draw participation. By being politically unaligned standards can be trusted without fearing hidden agendas.
- IETF is the most well recognized provider of standards for the internet and thus has the highest credibility of creating the infrastructure of global communication.
- Participants are individuals, building the foundation for the meritocracy.
- The standards process is completely open to everyone, creating strong incentives to participate.