

Open standards



Universitat Oberta
de Catalunya

www.uoc.edu

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1. Concepts

1.1. Open standards

A standard is generally a norm or specification regarding engineering or technical criteria, methods, processes and practices, generally achieved through a consensus of interested parties. Standards are usually created within the auspices of formal organisations like ITU, ISO, IETF, W3C, OASIS, etc.

Examples of standards in the technology arena

- **HTML** (HyperText Markup Language): specification of markup language for web pages.
- **XML** (Extensible Markup Language): a set of rules for encoding documents electronically.
- **SOAP** (Simple Object Access Protocol): a protocol specification for exchanging information in the implementation of web services.
- **Unicode**: a standard for the consistent representation and manipulation of text expressed in most text editing systems.
- **ODF** (Open Document Format): an XML-based file format for representing electronic documents such as spreadsheets, charts, presentations and word processing documents.

While there is no definition of an **open** standard –this is one of the key elements of the debate about open standards– it is generally considered to be a standard created through a process where any interested party may freely participate and collaborate (with formalised open standards organisations or committees or not) and made available to the general public on a royalty free and non-discriminatory basis.

It has been argued that an open standard is more than a mere specification. An open standard is "open" because of the principles behind it and because of the way in which it has been publicly developed, approved and made accessible. It is governed by a collaborative and consensus driven process.

An open standard is generally built on the principle that it is available for every end-user to obtain, read and implement, with no royalty or fee. Certain parties have argued that a fee may be imposed (e.g. for certification of compliance by a standards organisation), which must then be a low or reasonable cost (RAND). However, for many that is not acceptable (see below).

An open standard is also based on the principle of non-discrimination, so that no software producer is favoured over another other with respect to an implementation of the standard, other than through the producer's own technical

Author citation

"An open standard is more than just a specification. The principles behind the standard, and the practice of offering and operating the standard, are what make the standard Open."

Source: Bruce Perens

skills and efficacy. Consequently, copyright or patents which cover standards – one way of achieving discrimination – must be licensed royalty-free and without discriminatory terms, if the standard is to be "open".

The principles of open standards further include the possibility for obtaining an extension or subset form of the implementations.

All this is developed further below.

1.2. Definitions?

One of the current difficulties in relation to "open standards" is that there is no universal definition. In fact, there are different definitions for both terms "Open" and "Standard" and there are different levels of application of standards at national, regional, international levels with "internationally recognised standards" bodies playing a big role in this area.

Some internationally recognised standards organisations refer specifically to "open standards" whilst others refer simply to producing "standards". For instance,

- IEFT (Internet Engineering Task Force) and ITU-T (the standards developing organisation in the Telecommunication Standardisation Sector which coordinates standards for telecommunications on behalf of the International Telecommunication Union) refer to *open standards*.
- IEC (International Electrotechnical Commission that prepares international standards for all electrical, electronic and related technologies) and the ISO (the International Standard Settling Body) only refer to producing "standards".

Hence the term "open standard" on its own is not a term which has a universal understanding. Its definition often depends on geographic region, on the particular standards body or organisation and on the context and field of use.

What generally appears to remain universal in all the various definitions are the common principles of:

- Public participation in creation.
- Public availability.
- No royalty.
- Non-discrimination.
- The possibility of obtaining an extension or subset form to the implementation.

Supplementary content

In fact the IETF does not have its own specific definition of "open standard". However, the IETF standards fulfil (and may therefore be considered to share) the ITU-T's definition of "open standards".

In other words, an open standard must be accessible to anyone and there should be no restrictions to implementation and or discrimination between users. It is usually free of charge and not subject to any payment of any intellectual property rights or legal rights necessary to use, deploy or distribute their implementation.

The term "open standard" is also sometimes coupled with "open source" with the idea that a standard is not truly open if it does not have a complete free/open source reference implementation available (c/f Tim Simcoe: Chapter 8; open standards and Intellectual Property Rights', to appear in Open Innovation: Researching a New Paradigm). See below.

Thus there are a number of approaches, some of which are commented below.

1.2.1. ITU-T definition

Within the ITU, "open standards" are standards made available to the general public and are developed (or approved) and maintained via a collaborative and consensus driven process. "Open standards" facilitate interoperability and data exchange among different products or services and are intended for widespread adoption.

Other elements of "open standards" include, but are not limited to:

- Collaborative process – voluntary and market driven development (or approval) following a transparent consensus driven process that is reasonably open to all interested parties.
- Reasonably balanced – ensures that the process is not dominated by any one interest group.
- Due process – includes consideration of and response to comments by interested parties.
- Intellectual property rights (IPRs) – IPRs essential to implement the standard to be licensed to all applicants on a worldwide, non-discriminatory basis, either (1) for free and under other reasonable terms and conditions or (2) on reasonable terms and conditions (which may include monetary compensation). Negotiations are left to the parties concerned and are performed outside the Standards Development Organisation (SDO).
- Quality and level of detail – sufficient to permit the development of a variety of competing implementations of interoperable products or services. Standardised interfaces are not hidden, or controlled other than by the SDO promulgating the standard.
- Publicly available – easily available for implementation and use, at a reasonable price. Publication of the text of a standard by others is permitted only with the prior approval of the SDO.
- On-going support – maintained and supported over a long period of time.

1.2.2. European Union definition

The European Union on the other hand adopted the following definition in its European Interoperability Framework: (c/f European Interoperability Framework for pan-European eGovernment Services, Version 1.0 (2004) ISBN 92-894-8389-X page 9).

The minimal characteristics of an open standard are:

- The standard is adopted and will be maintained by a not-for-profit organisation, and its ongoing development occurs on the basis of an open decision-making procedure available to all interested parties (consensus or majority decision, etc.).
- The standard has been published and the standard specification document is available either freely or at a nominal charge. It must be permissible to all to copy, distribute and use it for no fee or at a nominal fee.
- The intellectual property – i.e. patents possibly present – of (parts of) the standard is made irrevocably available on a royalty-free basis.
- There are no constraints on the re-use of the standard.

1.2.3. Spanish law definition

In Spain, a law passed by the Spanish Parliament (c/f Ley 11/2007¹ of Electronic Access of Citizens to Public Services, June 22, 2007), requires that all electronic services provided by the Spanish public administration must be based on (1) open standards or (2) "eventually, on an ancillary basis, standards that are generally used by citizens" (which is not very satisfactory from a "open standards" perspective, and raised considerable debate).

It defines an open standard as royalty free, according to the following definition:

An open standard fulfils the following conditions:

- It is public, and its use is available on a free [gratis] basis, or at a cost that does not imply a difficulty for the user.
- Its use is not subject to the payment of any intellectual [copyright] or industrial [patents and trademarks] property right.

⁽¹⁾See Annex to the Law 11/2007 online at noticias juridicas site.

1.2.4. Open Source Initiative's Requirement

The Open Source Initiative (OSI) is an organisation that promotes open source software (OSS) (see Module 4). As to the Open Standards Requirement (OSR) for open source software (OSS), the Open Source Initiative defines its requirements and criteria as follows:

- All necessary detail and any process for fixing flaws discovered under implementation and interoperability testing must be disclosed for interoperable implementation under terms which comply with OSR. In other words, no relevant detail must be withheld.
- The open standard must be freely available and accessible under royalty fee terms at reasonable and non-discriminatory cost.
- All patents essential to implementation of the standard must be licensed under royalty fee terms for unrestricted use or be obliged to a pledge of "non-assertion" in relation to open source software.
- There must be no agreements to execute a licence agreement, Non Disclosure Agreement, grant, click-through, or any other form of paperwork to deploy conforming implementations of the standard.
- Implementation of the standard must also not require any other technology that fails to meet the criteria of this requirement.

The above criteria must be met otherwise it will discriminate against open source developers.

2. Standardisation processes – forums

There are generally three levels of standards according to where they are created:

- National standard via national standards organisations.
- Regional standard via regional standards organisations.
- International standard for example international standards organisations such as IETF, IEC, ITU-T and ISO (ISO in itself is composed of various national standards organisations.).

Standards bodies are however only a method of achieving standardisation. There are also other types of standards for example industry de facto and government standards.

- **Industry de facto standards** are popular because the benefits of standardisation are often very high, increasing the user's ability to interoperate with others. The downside is that proprietary technology is often required which necessitates the payment of licensing fees to the relevant providers of that technology.
- **Government standards** on the other hand, can be provided via enforceable laws or regulatory body mandates adopting such government standards.

The main distinction between industry de facto / government standards and open standards is the element of openness in the collaborative efforts to create the standards, specifications and technology. Such openness and collaborative efforts are meant for easy accessibility and widespread use in order to implement those specifications.

3. Benefits of open standards

Why is there a need for open standards?

Author citation

As the Free Software Foundation Europe (FSFE) states: "open standards allow people to share all kinds of data freely and with perfect fidelity. They prevent lock-in and other artificial barriers to interoperability, and promote choice between vendors and technology solutions."

By adopting an open standard, the end-user/customer is not locked into a particular vendor. This decreases reliance of any one vendor specification, thereby maximising end-user choice resulting in a more competitive market for implementation of the standard. This ever more important in a networked world where more and more data and applications move to the net (in "computing clouds") and users lose direct control of their data and need interoperability to maintain a degree of control and be able to "exit" the cloud if necessary.

Supplementary content

Think of the HTML standard. Due to this standard, Netscape Navigator and subsequently Firefox web browsers managed not only to exist and survive, but also ensure compliance with the standard by web page developers and other browsers.

Generally speaking, open standards can achieve the following:

- They promote interoperability and integration between various applications or networks.
- They can consolidate competing standards and overcome differences in technical regulations and to decrease barriers in commerce (from local to international).
- They can facilitate not just application integration but also data exchange or integration among different products, components or services; and decrease duplication which enable applications to work together to perform or complete a process.
- They enable an increased representation of diverse interests and stakeholders in building the ICT infrastructure of our networked society. This leads to continual improvements, wider support, increased vendor competitiveness and flexibility.
- They reduce risk for end users who use solutions that comply with open standard specifications, being able to swap applications in the event of any disaster or unforeseen circumstance, and enable them to integrate their systems with third parties such as government, suppliers, customers and partners.

Let us look at two examples

- **Interoperability.** The use of the internet's TCP/IP communications protocol created a worldwide infrastructure for collaborating and coordinating resources since virtually any component on a network can communicate with any other component. The use of the TCP/IP open standard by any stakeholder allows them to use the specifications to build their own solutions. As interoperability increases and barriers to integration of disparate system decreases, one's ability to automate processes between technologies, platforms, languages and customisations increases correspondingly.
- **Integration.** As the standards of web services (SOAP, etc.) whose protocols are based on open standards achieve and gain growing acceptance, it is clear that originally economically infeasible web platforms can now be created through integration of different components. The "plug and play" concept to integrate devices and computer component is an example of such integration. It is simply based on a standardisation of integration specifications with an automation of common requirements.

An open standard, by helping to define component interfaces, increases interoperability. This leads to simpler, repeatable and quicker integration efforts. Besides, the use of an open standard effectively replaces many unique vendor solutions and increases the availability of resources sharing the same processes. Therefore where there would for instance previously be three vendor specialists using their own different proprietary technologies for achieving methodologies for their respective solutions, now the use of an open standard specification increases the pool of available vendor specialists for a given solution from one resource pool supplying knowledge or technology using that specification to three.

To ensure interoperability issues with suppliers, customers, partners and other related entities demand the need for optimisation of options which are of quality, durable and flexible in a corresponding environment where risk is reduced. Adopting an open standard increases options that lower risk in many ways.

The greater the optimisation and accessibility of the infrastructure built through an open standard, the greater the demand for innovation leveraging it. Continuous improvements can be driven until there is a need for a replacement of another new open standard, whereupon another door can be opened to collaboration on migration and interoperability.

By its nature of setting the open standard process through common open dialogue, communication is streamlined, allowing all end-users (educational or corporate institutions) to apply the concept. It also achieves a higher productivity from such users when compared to operating with closed concepts. Since an open standard is developed in a collaborative environment with open participation in the standard setting process, widespread and early open public and peer review becomes natural. This in turn increases early identification and resolution of potential problems which usually leads to higher quality results and better public reassurance in comparison to proprietary options.

As an open standard is supported by many suppliers, they are more durable by nature as compared to any more limited vendor solutions. Over the long haul, there is also more probability of the availability of support and continuous improvement. By nature, an open standard is not subject to a single vendor's interest but are more reflective on the demands of users, making them more durable.

Example

An example provided by the OpenStandards.net organisation in this regard is the use of the Structured Query Language (SQL) which is used throughout the relational database industry by Oracle, Microsoft and IBM as no single vendor has sufficient control to replace it.

Additionally, as technological progresses over time, proprietary solutions tend to be isolated as is shown by the early CompuServe and prodigy networks which have disappeared while the internet is growing at a phenomenal rate.

Furthermore, the fact that an open standard is supported by various vendors provides the end-user more independence from any one single vendor who might, absent open standard specifications, require the end users to rely on its own proprietary standard. This would in turn reduce end-user choice and competition. This is distinguished from de facto industry standards which encourage such end-user dependence. Increasing vendor options also result in reducing vendor costs and in reducing end-user risk, since such risk is transferred from a single vendor to multiple vendors implementing the same open standards.

Consequently, businesses developed around open standards benefit from a cost reduction, speedier market entry and an increase in market adoption and acceptance. This should result in an overall higher return on investment (ROI) as well as higher vendor independence. The competition between manufacturers and vendors creates pressure to produce and share improvements, with overall improvements for end-users.

4. Controversies regarding open standards

While there is a general understanding of the benefits of open standards, and even certain legal dispositions which mandate their use or implementation, in practice the situation is more complicated, because there are several forces pushing against the use of open standards, in particular proprietary (non-free) software and technology manufacturers who either have an interest in owning or controlling the specification of standards, or are interested in NOT implementing standards to maintain user lock-in.

4.1. Non-standard products

The most obvious area of conflict in relation to standards is that of vendor lock-in when using non-standard formats or protocols – made possible due to a dominant position or other factors (such as a copyright or patent right) of a vendor, whereby the vendor uses the economic or legal factors to leverage and "impose" de facto the use of a proprietary / closed standard.

The typical example of this has been document formats in Microsoft® products, such as .DOC and .XLS. Microsoft's dominant position in the office suite market has created a "de facto" standard for document formats – to the point, for example, where bidders had to use these formats to submit bids for public contracts. The argument being that everyone needs to purchase Microsoft products to be able to create, read and exchange documents with third parties. This is obviously no longer the case, as software from other sources, such as OpenOffice.org, can read Microsoft formats (after significant investment in legitimate reverse engineering of those formats).

This is also visible in the strategy of "adopt and extend", whereby a vendor adopts a standard but then extends it with proprietary extensions, requiring thus the purchase and use of the vendor's products if one wanted to interoperate with this vendor's implementation or use the resulting files (e.g. regarding formats).

This may conflict with law regarding anticompetitive behaviour, which we comment on after reviewing the Intellectual Property Right issues pertaining to standards.

4.2. Copyright and patent rights

There has been a lot of controversy and debate over the conflictive relationship between standards and "intellectual property rights", which in this case we include copyright and patent rights.

These rights are involved in two manners.

- **Copyrights:** A standard specification is a work protected by copyright (generally of the standards organisation that promulgates the standard,

Example

Examples of this are CIFS (Common Internet File System), which gave rise to a European Commission investigation, and Kerberos extensions. See Wikipedia "Embrace, extend and extinguish" for a controversial discussion and more examples.

but also potentially members of the work groups that participate in the process or submitting a specification as a standard). There is debate therefore whether:

- The organisation should be entitled to charge fees for accessing, reproducing and distributing the work that embodies an open standard.
 - An implementation of the standard is a derivative work of that standard, and thus subject to authorisation by the rights holder of the standard.
- **Patents:** A standard specification defines a method or procedure on how to do something, and thus can fall squarely within the area of patentable subject matter. Thus any person having patent rights over the method specified by the standard can prevent anyone from implementing the process without licence.

Standards and patents, in particular, are intrinsically linked, as they both aim to encourage invention and creation through disclosure. To encourage publication or disclosure of breakthroughs which would in turn benefit the public, the government grants a patent owner with exclusive rights (monopoly) to his invention over a limited time. On the other hand, standards are also related to disclosure – they establish a common ground, promote interoperability and competition for the public benefit, facilitating customer choice between various products and services; and enable the exchange of information between one another without problems.

Although both benefit the public, upholding one deprives the other function.

Regarding patents and de facto standard, see the debate on GIF formats and Unisyst, commented.

The European Commission recognised that IPR owners and the beneficiaries of standards should be protected alike. However the common argument is that by allowing patents on standards, a monopoly is granted over part or all of the specification to certain private parties, a monopoly that includes the right to block implementation by other parties. Therefore the initial good intention in granting patents to encourage innovation for the public benefit might in the end lead to the prevention of further innovation down the line, when it prevents others from marketing their innovation just because it implements or interacts with the original invention.

The only way to avoid the patent is to create products or processes that circumvent them – thus falling into non-compliance with regard to the standard.

Other types of specifications are also sometimes referred to as standards and "belong" exclusively to organisations that own the copyright to the specification. As such, any right to the use of the specification can only be owned under restrictive contractual terms and are therefore not considered fully "open". For example, the rules for standards published by the major internationally

Supplementary content

For further reading, see: Analysis on balance: Standardisation and Patents at the FSFE site.

recognised standards bodies such as the IETF, ISO, IEC, and ITU-T permit their standards to contain specifications whose implementation will require payment of licensing fees.

4.3. Striking a balance?

In an attempt to mitigate the conflict and to balance the mutual benefits of standardisation and patents/copyright, and in particular to control the use of patent granted monopolies, the standardisation community have suggested adopting the "Ex-Ante Disclosure" mechanism and (F)RAND regime discussed further below.

- Declarations and Ex-Ante Disclosure

If a specification or method proposed for a standard is covered by a patent or copyright right, the parties involved in the standardisation process are supposed to use the ex-ante disclosure mechanism which obliges them to disclose the existence of an IP right over a specification and the licence terms relating to it, otherwise the specification would not be included in the standard.

See for example, ETSI² and ITU³ sites.

⁽²⁾See information on how to declare IPR and on ex ante disclosures at the ETSI site.

⁽³⁾ITU also includes disclosure in its patent policy.

This theoretically allows members of the process to review the terms (or summary) and determine if they are acceptable or beneficial for the standard or not.

One criticism of this approach regards what are in fact acceptable licensing terms in these circumstances? They tend to vary and often prove to benefit corporations with a large patent portfolio as compared to the economic majority represented by SMEs which has no say regarding the acceptability of the terms imposed (see below on FRAND).

This has raised serious arguments over the membership of standardisation committees and organisations, as large commercial entities leverage their power to participate and propose technologies or specifications over which they have rights as an eventual standard.

- (F)RAND

In reality, most standardisation bodies appear to opt for mere voluntary disclosure with assurance from other parties to approve RAND or FRAND ("Fair, Reasonable and Non-Discriminatory") terms for licensing patent rights on standards and not to exercise their exclusive monopoly rights as patent holders. In other words, (F)RAND generally amounts to a loose assurance to compulsory

licensing of their patent rights upon request. This was seen to ensure the right owner the opportunity to receive a reasonable return from his patent rights, and rewarding his innovation, and the time and creative effort.

A (F)RAND licence is sometimes imposed when joining the standardisation body, through membership rules. Participating companies having IP rights on technologies which become essential to the standard agree to equally allow other groups to implement the standard and license them those patents on reasonable charges, hence allowing competition between multiple companies which implement the same standard.

However a number of problems arise: What is reasonable licensing terms and for whom, since such terms vary depending on many factors e.g. commercialisation policies, whether or not a company has stake in the relevant market.

Another criticism is the usual non-perpetual nature of the licence, thus holders of patents on additional claims are free to enforce their patent terms in whichever way they like, including against existing (legitimate) implementations on the standard (the latter of which is in fact legitimate under the patent system). As a consequence, there is substantial uncertainty under the (F)RAND regime which invariably favours large companies which are better able to deal with such uncertainties, as compared to SMEs.

A further critic is that even (F)RAND terms linked to zero royalties (or are royalty free) discriminate against Free Software since they do not allow sublicensing permitted by usage of Free Software (bearing in mind that the basis of Free Software or Open Source is that every living person or legal entity can be a user, developer, distributor or any of the combination).

FRAND terms also create an uneven playing field, for example in situation of public tenders requiring compliance with patented standards, whereby one bidder, not holding the IPR on the standard, has additional costs over the IPR holder bidder. This reduces or excludes competition.

4.4. Potential breach of (EU) Competition Law

Competition issues come into play because if a de facto or patented standard becomes a required specification, any operator without the IPR to be entitled to implement the standard would have its hands tied in the sense that it will have no choice but to license the IPR, at additional cost.

Free participation in the market is therefore not possible, or only on terms that are not commercially viable to the market entrant, and this could lead to market foreclosure or unfair terms of participation, resulting in possible breaches of the EU competition law: either Article 101(1) (formerly Article 81(1) EC) or the EU Treaty or Article 102 (Formerly Article 82).

- Article 101(1) prohibits agreements which prevent, restrict or distort competition within the Common Market and which affect trade between

Member States, unless they are capable of exemption under Article 101(3). Agreements regarding licensing terms – between participants or stakeholders within the context of a standardisation process – could fall foul of this provision.

- Article 102 prohibits the abuse by one or more undertakings of a dominant position within the market or in a substantial part of it which affects trade between Member States. Abuses can include imposing unfair or discriminatory terms, tying, bundling or exclusionary behaviour.

Any individual or collective dominance of the existing standards "owners" or participants which result in dictating discriminatory behaviour or constructive refusal to supply where the terms of participation would not be commercially viable, etc. would breach Article 102 of the EU Treaty.

Exemption is however granted under Article 101(3) where the agreement (e.g. relating to the standard) contributes to improving the production or distribution of goods or to promoting technical or economic progress, whilst allowing consumers a fair share of the resulting benefit. The said restriction must not be indispensable to the attainment of the objectives in question and not substantially eliminate competition for the products in question.

- For a US view, see William M. Hannay: "United States Antitrust Law Regarding Standard Setting Bodies", presentation at the Joint session Competition Law / IP Commission on The Interaction between Intellectual Property and Antitrust Law, UNION INTERNATIONALE DES AVOCATS.
- For the EU, see papers from the EC sponsored "IPR in ICT standardisation one-day workshop".

5. The Future Way Forward?

It might be a long while before a remedy is really workable in the patent and standardisation situation and where a consensus is reached between government, SME, free technologies and large corporations. In the interim, several issues have been highlighted as partial measures to ensure the full benefits of standardisation:

- **Interoperability.** As we have seen, interoperability (either at applications level or on file formats) is one of the main objectives of standards. A proposed solution, similar to the interoperability carved-out in copyright law, is to provide that patent rights cannot limit the creation of interoperable products.
- **Competition:** it would be favourable to determine the conditions in which the authorities would consider proprietary manufacturer/vendor IPR licensing terms and an approach to standards as illegal anticompetitive behaviour.
- **IPR policies.** The policies of standards setting organisations should require non-discriminatory royalty-free licensing of any IPR over a standard, enabling any business model (including free software licensing based models) to implement the standards and participate in the market.
- **Government procurement:** as a way of putting pressure on the market to move towards true interoperability and competition, rules regarding public tenders should ensure technological neutrality and require compliance with standards that are fully open (e.g. not subject to IP restrictions); and not rely on "standards generally accepted in the industry" or "used by citizens", which can be encumbered. This would enable a participation of all potential players in the market on a level playing field.

A key issue is that open standards are the basis for creating technological, economic and social ecosystems. Standards development and the ecosystem around open standards amount to a single community of interests, with interoperable or interchangeable products that allow vendors to compete on the innovation, not the standard. But ecosystems cannot rely on vague IP policies – even so-called RAND – whose general purpose is to limit, exclude or just to enable the rights holder to make economic profit from controlling entry on the market. The free software movement has proved that collaborative methods are based on free and open source licensing (and not much more). Conversely, restrictive licence agreements are anathema to collaborative methods: collaboration requires complete freedom of distribution and no barriers at all.

Further reading

- Websites:

<http://www.openstandards.net>

<http://perens.com/OpenStandards/Definition.html>

<http://progfree.org/index.html>

- Patents and standards. FSFE. <http://fsfe.org/projects/os/ps.en.html>
- Workshop papers from the EC sponsored workshop: "IPR in ICT standardisation", at http://ec.europa.eu/enterprise/newsroom/cf/itemshortdetail.cfm?item_id=3371
- Pat Treacy and Sophie Lawrance, "*FRANDly fire: are industry standards doing more harm than good?*" *Journal of Intellectual Property Law & Practice*, 2007