

# The Principles of Open Standards

By Kenneth Krechmer

The values underlying “Open Standards” are impressive. In the United States, the Open Standards concept has been applied to technical standards<sup>2</sup> since 1918 by the American National Standards Institute (ANSI)<sup>3</sup> as the administrator and coordinator of the U.S. private sector voluntary standardization system. A major goal of ANSI is to ensure that its guiding principles of openness, consensus, and due process – the cornerstones of Open Standards – are followed.

The personal computer revolution and the following Internet explosion have resulted in a large influx of new technical standards stakeholders<sup>4</sup>. These new stakeholders are making new demands on the Open Standards processes. Today, considering the rapid changes in technology and the expanding importance of technical standards, ANSI and its Standards Development Organizations (SDOs) need to reexamine what constitutes the “free and open encounter” that Open Standards strive to achieve.

## *Open Standards*

Open Standards is a changing concept, molding itself to the evolving needs of an open, consensus based society. Currently ten concepts are considered, at least by some, to constitute part of the principles of Open Standards:

1. Openness - all stakeholders may participate in the standards development process.
2. Consensus - all interests are discussed and agreement found, no domination by a single interest group.
3. Due Process - balloting and an appeals process may be used to find resolution.
4. Open IPR - holders of Intellectual Property Rights (IPR) must identify themselves during the standards development process.
5. Open World - same standard for the same function, world-wide.
6. Open Access - all may access committee documents, drafts, and completed standards.
7. Open Meeting - all may participate in standards development meetings.
8. On-going Support - standards are supported until user interest ceases rather than when provider interest declines.
9. Open Interfaces - interfaces allow additional functions, public or proprietary.
10. Open Use - low or no charge for IPR necessary to implement an accredited standard.

The first three principles are at the heart of the existing ANSI Open Standards concept. These are required procedures of ANSI for all accredited standards organizations<sup>5</sup>. The fourth principle (Open IPR) has been formally added to the standards development process by ANSI, its accredited SDOs, and many international standards development organizations. The fifth principle (Open World) is supported by ANSI but not required. The additional five procedures represent Open Standards concepts which are emerging but which are not yet supported by most accredited SDOs. To what extent should Open World and the additional five procedures be considered principles of Open Standards?

## *Open World*

Open World is the principle of unified world-wide standards. ANSI currently supports, but does not require, coordination of U.S. standards work with world-wide standards. Certainly, unifying different regional standards can be a very lengthy effort. Consider the limited progress on metrication in the U.S. since the passage of the “Metric Act” in 1975. A more positive, but very lengthy, example is the June 1998 approval of European Telecommunications Standards Institute (ETSI) TBR 21. TBR 21 in combination with two ETSI Guides defines the different European country variations of analog telephone systems. In Europe, for more than a century, at least 20 separate national telephone equipment markets have existed, each with 1 million to 100 million consumers. ETSI’s completion of TBR-21A is now creating a single market of more than 500 million consumers. Of course, definition of the variation is not in itself compatibility, but it is a start after 100 years!

Fortunately, the future is not so bleak. Understanding that it takes very long spans of time to resolve a lack of coordination in the past appears to be a significant contributor to better coordination in the future.

Recently, the analog telephone approval standards of Canada and the U.S. were merged after several years' effort in the ANSI-accredited Telecommunications Industry Association (TIA) TR-41 committee. And effective work is underway to merge U.S. and European PBX approval standards in the same committee. In addition, new approaches made possible by the use of programmable processors are making compatibility achievable even when competing regional standards do not find common ground.<sup>6</sup> So a combination of human efforts and technology appears to be improving the possibility of an Open World.

### ***Open Access***

Open Access is the principle that all may see any documents from an accredited SDO. All standards documentation falls into two classes: standards work-in-progress documents and completed formal documents (e.g., standards, test procedures, reports). Different stakeholders need to access these different classes of documents. Developers who wish to support emerging markets need access to standards work-in-progress. Developers who wish to serve the middle and later stages of the market would like to have free and easy access to the completed standards and similar documents. In the first case, access to the standards committee's work-in-progress is a necessary part of the developer's strategy. In the latter case, free access to completed documents removes a minor economic barrier.

The Internet Society (ISOC) supports a non-accredited standards making organization, the Internet Engineering Task Force (IETF), which has pioneered new standards development and distribution procedures based on the Internet itself. While the IETF does not meet the ANSI criteria for consensus and due process, in some ways it offers a very open standards development process. Using the Internet, the IETF makes available electronically both its standards, termed RFCs, and the drafts of such standards at no charge. In fact, using the facilities of the Internet, committee discussion of the draft standards can be monitored by anyone and responses offered. This rapid widespread development, deployment, and implementation of IETF standards has been extremely successful.

The IETF example offers some new direction to accredited standards development organizations. Conversely, the concerns of accredited SDOs for balance and due process are being considered by the IETF. Certainly, free and open access to standards work-in-progress, as well as to the final standards, is only part of the IETF success. But it is such a sufficient part that other standards organizations are now doing the same<sup>7</sup>.

### **Funding Standards Development**

The costs of standards development and standards distribution may be viewed as two separate areas. However, revenues relating to one area are often applied to cover costs in the other area. In this manner, standards document sales revenues may be applied to cover standards development costs (See Figure 1).

<b>Organization</b>	<b>Name of Codified Document</b>	<b>Funding</b>
Private company	Company specifications, practices	Profits
Groups of private companies	Group's procedures, criteria, rules	Pooled profits
IETF	Request for comments (RFC)	Dues, fees, government funding
Accredited regional Standard bodies	Standards	Member dues, fees, trade shows
Government Organization	Regulation	Taxes

**Figure 1**

The management of standards development is an overhead cost of the SDO. In addition to revenues from the sale of documents, each SDO may fund its standards development overhead in different ways. Accredited standards bodies fund their efforts with member dues and fees, although trade show revenues are becoming a larger contributor to the overall budget of more SDOs. Such trade shows also promote the use of standards, so the value of trade shows run by accredited standards organizations is two-fold for the

standards community. Private companies and groups of private companies fund their efforts to develop standards through their own profits. Governments usually fund the development of standards via taxes.

The major cost of standards development – expert participation – is born by the experts’ organizations. Whether the necessary experts come from the private sector or the public, their participation is costly not only in direct costs to their organization but also in indirect costs: what the experts might accomplish if they were not working on standards development. Fundamentally, the only reason for expert participation is to achieve the benefits of standardization. Expanding the stakeholders to improve market acceptance of the new standard is a basic reason why the experts invest their efforts in standards development. So if offering standards work-in-progress documents at little or no charge increases the number of stakeholders involved in the standards development process, it is an important principal to consider.

Offering free completed standards is only a minor cost reduction for developers or users and may be a significant income reduction for SDOs. Free distribution of completed standards is certainly a move towards “a free and open encounter.” But there are only a few market segments where free completed standards may create a significant change in the number of standards stakeholders.

### **Funding Standards Distribution**

The distribution of documents represents a recurring cost. In non-accredited bodies, the question of distribution funding is usually a marketing decision and often the documents produced are available at no charge. Conversely, accredited SDOs often use document charges to avoid increasing members’ dues.

In the past, the fixed costs of printing, handling, storing, and shipping documents suggested that a charge to the user acquiring the document was appropriate. With the advent of the Internet, it is possible to reduce to near zero the direct costs of document distribution, although the indirect costs of creating and maintaining Internet access to documents has to be considered. This significant reduction in the direct costs of document distribution using the Internet opens the issue of what to charge for standards from any accredited standards organization.

Providing standards documents at no charge expands the distribution of the document; for some segments of the population, such as graduate students, such additional distribution may be important. However if students can access committee work-in-progress documents including drafts of formal documents, they will have almost all of what they need. Conversely, it is difficult to imagine many for-profit developers who will not choose to purchase the final published specification. This argues in favor of providing committee work-in-progress documents at no charge to increase the stakeholders, and for SDOs to continue to sell completed standards to minimize any impact on their existing economic model.

### **Documentation Rights**

An interesting argument is emerging about the legal basis for ownership of standards developed in voluntary standards organizations. Since the standards documents produced are not works for hire, are they owned by the standards organization offering to sell them? Certainly standards organizations are taking steps to address this issue, but providing standards at no charge would appear to avoid it completely.

### ***Open Meetings***

Too often, non-accredited standards organizations develop specifications in some manner and either pass this work to an accredited standards organization or publish it themselves under the label “standard”. Why are existing accredited organizations not used for these tasks?

This question seems to have three possible answers:

- Existing accredited organizations do not have the expertise.
- Existing accredited organizations do not appear capable of doing the job in a timely manner.
- The accredited standards organizations do not appear open to new directions and membership.

The first answer is a fact of life. It is not possible to offer the expertise needed in all standards areas. The second and third answers, however, are based on appearances. Possibly the appearances need to change. Currently, openness is deemed to be met if all stakeholders can participate in the standards development process. This may present the appearance of a closed committee to those who are not current stakeholders – a subtle but real way that incumbent stakeholders dissuade potential future stakeholders.

Possibly, standards development meetings should be open to all (which the IETF offers) as well as provide open access to committee documents. In this way, informed choices may be made about bringing

new work to an accredited standards committee. Too often, stakeholders in a new technology are reticent to bring their ideas to an accredited standards committee they have no experience with, or access to.

The Open Standards concept may not be well served by stakeholder-only committee meetings. Ultimately, as technology use expands, technical standards stakeholders are everyone. Using the Internet, access to committee discussion can be opened to almost all. This review appears to argue for open standards development meetings. Participation in standards meetings, however, is a significant reason why some organizations join SDOs. So offering free meeting participation to all may well have negative economic consequences to some SDOs.

Meetings open to all also suggests the need for new rules. The news press participation in standards committee meetings has in the past been divisive, not due to the actions of the news press but more to the posturing of the stakeholders. Perhaps news press participation could fairly be limited to passive monitoring rather than active participation.

### ***On-going Support***

On-going Support of accredited standards may offer standards users better value for their capital investment. Users have a difficult time identifying the value to them of standards from accredited SDOs versus specifications (often termed “standards” by marketing departments) from non-accredited SDOs. The concept of on-going support of standards might be a way for accredited SDOs to provide identifiable value to the user community. The development and support of existing standards consists of multiple phases (See Figure 2).

<b>Phase</b>	<b>Activity</b>	<b>Description</b>
1.	Create Standard	The major task of SDOs
2.	Fixes	Rectify problems identified in initial implementations
3.	Maintenance	Add new features and keep standard up to date with related standards work
4.	Availability	Continue to publish, possibly with a notification of no continuing maintenance
5.	Recision	Removal of the published standard from distribution

**Figure 2**

It is difficult to interest users in the first phase of standards development. The first phase appears to properly be the providence of developers. Users, however, have a clear interest in maintaining the equipment and systems in which they have invested. On-going Support addresses the next four phases of standards work. Possibly with the advantages of the Internet to distribute standards and allow users to keep abreast of the work in standards meetings, greater user involvement in the on-going support of standards would be practical. This appears to be an area where the distribution of standards work-in-progress documentation and some related promotion could bring in more user stakeholders.

### ***Open Interface***

Open interfaces is an emerging technical concept applicable only to more complex compatibility standards. The idea that Open Standards should embody such a principle is quite new. But interest in open

interfaces has been increasing due to the considerable success of similar procedures in facsimile (T.30) and telephone modems (V.8 and V.32 autobaud procedures).

One way of achieving open interfaces is to implement a new technique termed an “etiquette”<sup>8</sup>. Etiquettes are a mechanism to negotiate protocols. While a protocol terminates an X.200 (OSI) layer, an etiquette, which may negotiate multiple OSI layer protocols, does not terminate (replace) any protocol layer function. An etiquette is used only for negotiating which protocol or features to employ. The purpose of etiquettes is connectivity and expandability. Proper etiquettes provide:

- Connectivity, negotiating between two devices in different spatial locations to determine compatible protocols.
- Means to allow both proprietary and public enhancements to the interface that do not impact backward compatibility.
- Expandability, so that the future communications devices can offer compatibility with the existing communications device.
- Easier troubleshooting by identifying incompatibilities.

As long as the etiquette is common between the equipment at both ends, or in the middle, it is possible to receive the code identifying each protocol supported by the equipment at the remote site. Checking this code against a database of such codes on the web or in a manual, the user can determine what change is necessary in his system or the remote system to enable compatibility.

One of the earliest etiquettes is ITU Recommendation T.30 which is used in all Group 3 facsimile machines. Part of its function includes mechanisms to interoperate with previous Group 2 facsimile machines and it allows new features (public as well as proprietary) to be added to the system without the possibility of losing backward compatibility. More recently, the V.8 etiquette was used to negotiate the V.34 modem modulation. Currently, G.hs is being developed to provide a similar function in Digital Subscriber Line equipment.

### ***Open Use***

Open Use would avoid IPR in public standards. This is a difficult concept to achieve. Remuneration for the use of IPR is supported by law to incent innovation, yet costly IPR and the overhead associated with acquiring IPR, dissuades developers, especially smaller companies. Finding a middle ground may require the use of an IPR arbitration function such as provided by the World Trade Organization during the development of each standard where IPR is claimed.<sup>9</sup>

Open Use supports public standards that do not promote private gain. The difficulty is that innovation has been shown to be closely related to private gain. While private gain from public standards is not an objective, supporting innovation is more important to society. Until the American society and its laws change, better IPR arbitration procedures to reduce the complexity of acquiring IPR are the only available means to address this issue.

### ***Conclusions***

Open Standards is a basic concept deserving of more active support by all accredited SDOs. Sometimes non-accredited organizations like to term their work “open standards”<sup>10</sup> when they meet few of the ten criteria identified. Some industry organizations develop their specifications and procedures, etc. in an open process. That is, they allow any to participate in the process who can pay the fee, although not necessarily as equals. Microsoft developers’ conferences and the Universal ADSL Working Group each offer some level of open process but certainly do not create Open Standards. The rationale behind Open Standards needs greater public exposure. Commercial organizations should not appropriate such an important concept.

ANSI, supported by its SDOs, should be charged formally with developing and implementing the concepts of Open Standards. Nine of these concepts should be considered. The first five principles are already a part of the existing Open Standards process. The next four appear to be emerging and may have significant value. Certain of these concepts have economic and technical import and must be addressed carefully. Based on the review above, the emerging Open Standards principles may be listed in rough priority (See Figure 3).

Open Standards Concept	Impact	Risk/Reward
Open Access - to committee work-in-progress documents	Little revenue loss, possible stakeholder increase	Low/medium
On-going Support - of accredited standards	Increased user participation	Low/medium
Open Access - to completed committee documents	Loss of standard document sales revenue	Medium/medium
Open Meetings - all may attend meetings	Loss of membership dues	Medium/medium
Open Interfaces	New technical requirements	Medium/high
Open Use - not practical to offer		

**Figure 3**

Reviewing these concepts on the basis of risk versus reward shows that Open Access to committee work-in-progress and On-going Support, with greater user participation in the later phases of standards work, are low risk ways to enhance the Open Standard process. Implementing these two concepts should be seriously considered.

Over the longer term, it appears that funding to SDOs from completed standards sales and from membership dues may be impacted by future expansions of the Open Standards concept. Therefore, it is advisable for ANSI-accredited organizations to look more to trade shows as a desirable funding source. And even more important, such trade shows could be used to promote increasing awareness of the value of formal standards. The broader exposure to the principles of Open Standards via a trade show format may add credibility to accredited standards work. Several trade shows supported by the standards industry (e.g., TIA's SuperComm) have been quite successful. ANSI, in North America, could take a greater roll in bringing together broader coalitions of formal SDOs into existing trade shows, thereby increasing attendance, as well as developing new trade shows where necessary.

Finally, the technical concept of Open Interfaces is emerging and may offer significant new benefits to all standards participants. Participants in standards committee work will have the opportunity to contribute to how this new technology direction will develop.

These are the current and potential principles of Open Standards visible today. Achieving lofty principles requires tireless effort. Total openness is probably impossible. But the task of Open Standards should be to strive towards that impossible perfection,

“Where ask is have, where seek is find, where knock is open wide.”<sup>11</sup>

#### Footnotes

<sup>1</sup> John Milton, *Areopagitica*, A speech for the liberty of unlicensed printing in the Parliament of England, 1644

<sup>2</sup> In this paper the term “standards” only refers to work from accredited standards organizations.

<sup>3</sup> Founded by five engineering societies and three US government agencies, ANSI remains a private, nonprofit membership organization. ANSI does not itself develop American National Standards; rather it facilitates development by establishing consensus among standards development organizations (SDOs).

<sup>4</sup> Stakeholders are those individuals and organizations that have a material interest in the technical standards development or use.

<sup>5</sup> American National Standards Institute, *Procedures for the Development and Coordination of American National Standards*, April 1998.

<sup>6</sup>For additional information see Ken Krechmer, *Recommendations for the Global information Highway: A Matter of Standards*, ACM StandardView March 1996.

<sup>7</sup> In July 1998, ETSI announced that its technical committee TIPHON (Telecommunications and Internet Protocol Harmonization Over Networks) will make available at no charge all committee documents and standards drafts.

<sup>8</sup> Ken Krechmer, *Technical Standards: Foundations for the Future*, ACM StandardView March 1996

<sup>9</sup>This use of WTO arbitration is discussed in greater detail in Ken Krechmer, *Communications Standards and Patent Rights: Conflict or Coordination*, Standards and Technology Annual Report (STAR) from Telecommunications Industry Association (TIA), 1997.

<sup>10</sup> Bill Gates, *Compete, Don't Delete*, The Economist, June 13, 1998.

<sup>11</sup> Christopher Smart, *A Song to David*, 1763. This is a paraphrasing of an earlier work "Ask, and it shall be given to you; seek, and ye shall find; knock, and it shall be opened unto you". Matthew 7:7

**Ken Krechmer** (krechmer@ix.netcom.com) is the founding technical editor of *Communications Standards Review* and *Communications Standards Summary* of Palo Alto, CA. He is a Senior Member of the IEEE and a Member of SES. Utilizing this broad view of formal communications standards work, he has consulted since 1981 and teaches how standards affect organizations' products and services. He has also been secretary of TIA TR-29 (facsimile standards) 1990-1995 and a US delegate to ITU-T Study Group 8 (fax), 14 (previous modem standards), 15 (xDSL) and 16 (current modem and video conferencing) meetings.

This paper was the 2<sup>nd</sup> place winner of the World Standards Day 1998 Paper Competition, sponsored by the World Standards Day Planning Committee and the Standards Engineering Society.