

The Making of Standards: Looking Inside the Work Groups

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ABSTRACT

This article attempts to contribute to a better understanding of how standards actually emerge by taking a closer look at what is going on inside standards setting committees. It discusses the results of a study of senior committee members from ISO, ITU, and the IETF; who they are, where they come from, which roles they assume during the process, how they perceive this process, and what they feel actually influences its final outcome: the standard.

INTRODUCTION AND MOTIVATION

“Standards are not only a technical question. They determine the technology that will implement the Information Society, and consequently the way in which industry, users, consumers and administrations will benefit from it [1].”

You can hardly put it more to the point. Despite all criticism and descriptions such as “hampering progress” or “trailing behind the market,” standards remain the sine qua non in virtually all fields of technology, and especially in information technology (IT).

Much has been written about various aspects related to standards and standardization, including but certainly not limited to the economic dimension of standards, standardization policies, the overall structure of standards setting processes and whether or not they fail to address today’s needs, and intellectual property rights. While the importance of these issues is beyond doubt, one crucial aspect has thus far been largely neglected: who is actually producing the standards? After all, a standard specification originates from a technical committee where a group of individuals try to find a working solution to a given problem; it is here the basic technical decisions are made. That is, we will need to look at the motivations, attitudes, and views that influence these people’s work on the committees

if we want a better understanding of why a particular specification emerged the way it did.

This article attempts to contribute to this understanding by reporting and analyzing the views of those who actually do the (technical) standards setting work. We will report the results of a survey of senior members of different working groups (WGs) in charge of standardizing electronic messaging systems. However, it should be noted that the sample size was too small to yield statistically significant results. Further research will be necessary here, but we are confident that this will confirm our findings.

The remainder of this article is organized as follows. The next section reports the actual opinions of the WG members as revealed by the survey; then some concluding remarks are made.

THE COMMITTEE MEMBERS

Following a brief description of the interviewees, their association with the standards bodies, and the roles they assume in standards setting, we will present and analyze their general perception of the different standardization processes and those factors they feel carry most weight when it comes to decision making.

GURUS AND NEWBIES

From the responses obtained it would seem that chairpersons, project editors, and rapporteurs (i.e., those who are represented in the survey) form a caste of “standards professionals.” The vast majority of respondents have been active in the field for a considerable time in various positions. Indeed, it appears that at least the International Telecommunication Union (ITU) and International Organization for Standards (ISO) are dominated by particularly long-standing members (Table 1).

With respect to members’ associations with committees, there is a striking difference between the Internet Engineering Task Force

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(IETF) on one hand side and ITU on the other, with ISO placed somewhere between. This difference, however, is not as unexpected as may appear at first glance. Until as recently as 1988, the International Consultative Committee on Telephone and Telegraph (CCITT), the predecessor of ITU — Telecommunication Standardization Sector (ITU-T), was basically a closed community, made up largely of postal, telephone, and telegraph administrations (PTTs) and equivalent national organizations. At the same time, the monopoly positions of the national PTTs had led to well-established relationships with the respective major domestic vendors. Consequently, the environment within which standards setting took place could be described as static, to say the least. Against this background, the high percentage of long-standing ITU committee members does not come as too much of a surprise.

The IETF is a very young organization by comparison, established to address Internet-specific technical problems. Accordingly, procedures adopted differ from those of the older “official” bodies in more than one respect. One of these differences is the nonexistence of a formal membership in the IETF; another is the comparably short life span of the individual working groups, which typically address only a narrow and well-defined problem. If you add the strong academic roots of the Internet, which resulted in strong academic participation in the WGs, the combination of these facts may well account for the lack of long-standing members (academics tend to change their employer eventually, move on to industry jobs, and give up standardization). A notable exception are the “gurus” who have been involved in the Internet from its earliest stages, many of whom now capitalize on their experience by running their own consultancy firms.

ROLES ASSUMED

A look at the respondents’ respective affiliations is also revealing. The vast majority work for service providers or vendors; in fact, more than 60 percent come from this side. In particular, it turns out that user companies are strikingly

	0–4 years	5–9 years	10–14 years	>14 years	Total
ITU	0	8 (32%)	13 (52%)	4 (16%)	25
ISO	0	8 (57%)	5 (36%)	1 (7%)	14
IETF	8 (50%)	7 (44%)	0	1 (6%)	16
Total	9 (13%)	27 (39%)	21 (30%)	12 (18%)	55

■ **Table 1.** Respondents’ association with standards bodies.

underrepresented; commercial users were not represented at all among the respondents, and 16 percent came from government organizations (which qualify as users as well) (Table 2).

The distribution of professional affiliations already suggests who dominates the committees. However, WG members might choose to adopt a more altruistic approach and see themselves as impartial champions of a technically sound, usable, and useful system or service, regardless of their employers’ commercial interests. However, it seems that this would be asking too much. Indeed, a strong relative majority of the respondents (41 percent) assume the role of a company representative. But considerable variations between the single organizations can be observed (Table 3).

In particular, a vast majority of IETF members describe themselves as “techies” (i.e., they see their paramount task as pushing technically clean and advanced solutions). However, this is not at all surprising: the framework within which IETF works — the narrow scale of the WGs and particularly the requirement for “*A specification from which at least two independent and interoperable implementations from different code bases have been developed, and for which sufficient successful operational experience has been obtained*” [2] if a specification is to be promoted to the level of draft standard — pave the way for a very technology-centric view.

GENERAL PERCEPTION OF THE PROCESSES

Asked to characterize the respective standardization processes they have been involved in and know of, opinions of committee members from

	Service providers/ vendors	Consult’s	Academia and research	Users (comm.)	Users (gov.)	Total
ITU	19 (76%)	1 (4%)	1 (4%)	0 (0%)	4 (16%)	25
ISO	6 (43%)	0 (0%)	6 (43%)	0 (0%)	2 (14%)	14
IETF	9 (56%)	1 (6%)	3 (19%)	0 (0%)	3 (19%)	16
Total	40 (58%)	2 (3%)	11 (16%)	4 (6%)	12 (17%)	55

■ **Table 2.** Affiliations of the actual respondents.

	National rep.	Company rep.	User advocate	Techie	Other	Total
ITU	7 (28%)	13 (52%)	2 (8%)	2 (8%)	1 (4%)	25
ISO	3 (21.5%)	3 (21.5%)	2 (14%)	3 (21.5%)	3 (21.5%)	14
IETF	1 (6%)	3 (19%)	2 (13%)	9 (56%)	1 (6%)	16
Total	11 (16%)	28 (41%)	10 (15%)	14 (21%)	5 (7%)	55

■ **Table 3.** How respondents see themselves.

Being open to everyone is seen as another major strength of the voluntary consensus process. This holds at least for the Work Group level considered here, albeit with one reservation: you have to be able to afford it.

ISO and ITU differ widely; there is virtual unanimity among IETF working group members. Most respondents from the former expressed a rather balanced view of the respective processes; acknowledging that consensus is important, that the lengthy processes, though laborious and sometimes frustrating, are required to reduce the risk of faulty specifications, and to guarantee fairness and openness of the process and thus ensure the widest possible acceptance of the standard, taking into account all views.

"In general, I would characterize the formal standards process as open to all interested/affected parties that produces generally stable standards which are moderately successful in the marketplace (i.e., get built into real products that people buy)."

Members of ISO also noted that at times the process is far too lengthy and too formal, and that these attributes may — and sometimes do — thwart a standard's takeoff in the market.

"Formal, bureaucratic, thorough, painstaking, arduous, satisfying, useful and necessary, slow-moving, evolving, subject to national interests, dependent on few dedicated individuals in each area of standardization, the consensus process is both frustrating and satisfying, rewarding, and economically troubled."

"High-quality" and "stability" are the most important positive characteristics attributed to the standards produced by voluntary, consensus-based processes. In general, though, most respondents were rather neutral in characterizing their respective body's process, and attempted to be fair and unbiased. Most respondents seem to have come to terms with the fact that they are not in a position to do very much about perceived weaknesses. Indeed, things that have been improved recently (abandoning the four-year cycle within ITU-T, introduction of the fast-track and PAS procedures within ISO JTC1) were ultimately triggered by a combination of market influence and pressure from "competing" standardization bodies or industry for other than grass-root initiatives.

Comments on the strengths and weaknesses of the respective processes largely come down to one prevailing observation: that, ironically, they are the same. The processes' paramount strengths — being taken seriously by participants; leading to reasonably mature and stable recommendations, accepted by a broad constituency; being open and observing due process — at the same time represent the major weakness, in that they lead to specifications that may have missed the window of opportunity, having been overtaken by the technical development and/or the market.

Being open to everyone is seen as another major strength of the voluntary consensus process. This holds at least for the Work Group level considered here, albeit with one reservation: you have to be able to afford it. Apart from that, virtually everyone can participate at the technical level (with the ITU somewhat more selective than ISO), and all ideas will receive consideration.

As far as perceptions of the process adopted by the IETF are concerned, almost all respondents particularly stress the fact that in their view this process is far superior to the "tradition-

al" ones adopted by ISO and ITU.

"The IETF has the smallest and most sensibly designed process of any of the standards bodies active at present, and because of this it is lightyears ahead of any of the other standards groups. (I have also participated in ANSI and ISO standards work as well as in the EMA [Electronic Mail Association], so I have a reasonable basis for comparison)."

Respondents from IETF WGs also agreed on the perceived strengths of their process. Many exhibit a considerable degree of what can be viewed as either enthusiasm or, indeed, naivete. Most consider the requirement for independent and interoperable specifications as the strongest point of the process, thus once more highlighting the technology-centric view already noted earlier as being characteristic of the IETF. The comparably small formal overhead and resulting speedy process are also seen as major strengths, as is the openness of the process — "everyone can speak." However, not unlike the comments from members of the other bodies, this is also associated with a weakness by quite a few. "Naysayers" and "loudmouths" stand a good chance of delaying and possibly even obstructing the work; the process does not foresee any mechanisms for how to deal with such individuals. On a similar line, the process tends to split complex problems into small, easily comprehensible pieces, thus running the risk of losing the big picture. Finally, the dependence on a sufficiently high number of people prepared to do the work, and capable of actually doing it, is seen as another potential problem.

PERCEIVED INFLUENTIAL FACTORS

It is also worthwhile to take a closer look at what members feel influences the decision making process. To some degree perceptions here reflect the affiliations of the respondents; committees are indeed considered as being dominated by representatives of vendors and service providers. But two notable exceptions can be identified. First, the perceived influence of government within ITU bears no relation to the actual number of government employees, which was about 5 percent of the interviewees (and only slightly higher for all senior committee members). This perception may partly be a relic from the past, when ITU was pretty much a playground for national PTTs and administrations. In any case, at least in terms of numbers, government representatives do not play a major role anymore. It should be noted, though, that the upper levels of ITU are still dominated exclusively by PTTs and equivalent organizations, which continue to be the only ones with a right to vote in ITU. However, the ongoing process of deregulation is changing the environment in which they operate, as well as their positions within this environment. Accordingly, PTTs will act more like service providers in the future rather than national representatives. Some of the responses confirm this likely trend:

"Before, PTTs and/or governments were represented, but now it is changing. At the moment the most dominant bodies are manufacturers and service providers."

About one out of three respondents from ISO observed that individuals are most powerful.

"Oddly enough, it's been my experience that

individuals dominate ISO. Sometimes the individual will have a powerful multinational corporation or government/national interest on their side, but the bully pulpit is controlled by individuals, and only those with a strong sense of purpose survive.”

This may be attributed to the fact that ISO WG members are less inclined to act in a particular role (officially they act in a personal capacity). Within ITU a huge majority of members see themselves as representing company and/or national interests. Thus, their tasks are much more predefined by company/national strategies and leave less room to move.

In line with the above observation, respondents from ISO and ITU stress that speaking out at meetings for or against a proposal is the most important single factor influencing technical decisions. That is, even good proposals will hardly be considered if nobody is available to explain or defend them at meetings (and vice versa).

“For any given technical decision the presence of supporters/opponents weighs heavily, for in practice unless there is someone or some organization that champions a solution and pushes it forward it does not get as much consideration/exposure as alternate solutions. That is, group members typically do not delve into researching solutions that someone happened to send us unless such solution at first glance seems to be overwhelmingly good. More likely the members push the solutions that they already understand.”

The other two factors identified as influential — although of considerably lower importance — are a proposal’s technical merits and underlying company interests.

“The technical viability of a decision does carry great weight. As almost all members at the technical committee meeting level are engineers, the technical prowess of the solution, tied with the credibility (knowledge) of the person presenting it are very influential. On occasion, a company which already has a product back in their labs will also prove to be a formidable opponent.”

The above observations stress the importance that should be attributed to the “individual” level of the standardization process. Both, actively contributing to meetings and having a “strong sense of purpose” relate to individuals, as opposed to the rather more corporate attributes like “technical merits” and “company interest.” This ranking might make companies wishing to push their own proposal want to reconsider whom to send to the meetings — the expert or the demagogue.

These priorities are particularly disastrous for user companies. If their representatives were to work successfully in standardization or if they even attempted to push a proposal of their own, they would not only have to attend all meetings, but to establish a reputation as a knowledgeable person (which will cause extra problems given the widespread view: user = technically unsophisticated). Gaining this reputation takes time, a fact which collides with most users’ quests for quick solutions. Worse still, few, if any, user companies will have a sufficiently large interest in standards issues to send people to committee meetings over any longer period of time. The resulting financial burden would be considerable, and especially in times of recession, extremely few users will

endeavor such undertakings.

Things look completely different for the IETF. Here, the technical merit of a proposal is said to be the single factor of overwhelming importance. In fact, according to the respondents this is almost the only consideration carrying weight during decision making. An exemplary response from a work group member:

“Technical merits, clarity of presentation, willingness to do the specification writing, willingness to implement spec, immediate utility of spec, interest by vendors and users. Yes, personality, etc. have some effect, but not dominant.”

However, the above comment also reflects another characteristic of the IETF process. That is, it very much depends on individuals being prepared to do the actual specification and implementation work. Much of this work will require support of employers. It may therefore be concluded that these individuals are far more likely to be employed by either vendors or service providers, or academia. The former may hope to push their own proposals within the work groups, to be aware of the latest developments, and to capitalize on the gained knowledge and experience. The latter have traditionally been closely associated with the Internet, and will normally find it comparably easy to justify standardization activities. Users, on the other hand, will here as well need to have a very strong business interest before actually being prepared to pay for working time spent to specify standards.

In this context the IETF’s requirement for two independent interoperating implementations required for a proposal to progress on the standards track is of major importance as well. Again, to some degree this does not exactly push user participation since they are far more unlikely to devote time and resources to a pilot implementation of a protocol than are, say, universities or vendors.

Opinions of WG members are almost equally split about whether or not it is necessary to attend the four monthly IETF meetings in order to push a proposal. It could be concluded that this is less important than it is in the technical committees of the other bodies, but still far from being unnecessary.

SOME CONCLUDING REMARKS

The official procedures adopted by the different standards setting bodies may well lead to the assumption that the degree of control over, and influence on, the standards setting process is about equally distributed between the different stakeholders (including vendors, service providers, governments, and users). Indeed, this view is apparently quite popular with the standards setting bodies themselves. It yields a model of the standardization process which assumes that interested parties meet, compile, and review their — possibly only anticipated — needs and requirements, define the best technical approaches and mechanisms realistically feasible, and eventually come up with a standard that pretty much suits all needs and is likely to survive in the market. Unfortunately, though, this ideal scenario is far removed from reality.

Both the statistical information obtained

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through the survey and comments made by the individual respondents, as well as evidence from the literature [3], suggest that committees are to a considerable degree dominated by seasoned veterans who know all the nuts and bolts of the process (with the exception of the IETF, where the young age of the organization is reflected in both the average age of the single work group members and their short average time of association with the IETF). Since the vast majority of these veterans come from vendors and service providers, the prospects for real-world requirements to actually make it into the process look somewhat bleak. It has been widely confirmed that these requirements, which should be at the very heart of every standards setting activity, are very unlikely to originate from users, but are typically made up by technical committee members.

Various other factors, which do not necessarily bear a relation to the system to be standardized, are also channeled into the work groups, and shape the process outcome. Elsewhere, we have argued that the respective corporate environments of the committee members' employers, for instance, will play a major role in this context [4]. The different visions of how a technology should be used and the ideas of how this can be achieved are both formed by these local environments, which will exert a significant impact on the work of the committees. This holds especially in the case of anticipatory standards, which specify new services from scratch, and thus offer the opportunity to incorporate to some degree the particular presumptions of the originating committee. However, a reactive standard will likewise transpose the environment from which it originally emerged; that is, the corporate environment of its inventor (typically a vendor or a service provider) who specified the system upon which the standard will be based. Again, a vendor's visions will implicitly be embodied in the standard specification.

The study also showed that decisions of the committees are made for a variety of reasons, technical merits being but one of them. Outspoken supporters regularly present at meetings, for example, are apparently far more important for a proposal to be accepted, with company interest playing a major role as well. Again, vendors and providers stand to benefit the most from these priorities, since they typically do have a company interest in a prospective standard, and will therefore be prepared to send capable people to all meetings. It has been claimed that this does not hold for the IETF, where technical merits are said to be of overriding importance. Given the commercialization of the Internet, the increasing corporate interests in IETF standards and standardization, and the similarly rising stakes, it remains to be seen whether this will continue to be the case (i.e., what will happen if technical excellence stands in the way of corporate gains).

In general, user participation in standards setting is a somewhat controversial issue. Whereas popular opinion (shared by the standards setting bodies themselves) is that significant user participation would almost be a panacea for all problems (see, e.g., Hanrahan, 1995), committee members express far more differentiated, and indeed opposed, views. This is not at all surpris-

ing, since a closed circle of technical experts is far more likely to cooperate smoothly on a technical problem without bothersome interference from "outsiders."

Users are the ultimate sponsors of standards, and the only ones in a position to contribute meaningful real-world requirements to the process, and their voice needs to be heard and indeed strengthened. However, the problems that are likely to come with an unconditional increase of the number of user representatives on the committees must not be ignored. Committee members tend to see themselves primarily as corporate representatives, which holds particularly for members from user companies, who do not normally see themselves as user envoys in general. It may accordingly be concluded that they only contribute requirements specific to their respective environments. Given the huge variety of business sectors, organizational forms, and business philosophies, the many different intra- and inter-organizational interdependencies, and all the differences that come with varying company sizes, not to mention regional or national differences in culture and legislation, it is most unlikely that coherent requirements will ever materialize. Against this background, and whatever its true motivation, the call for a "user mandate" made by some committee members appears to be valid. However, it is also worth noting here that apparently no such mandate is necessary for representatives of vendors and service providers. Their roles have never been questioned, although their tasks obviously and prominently include representation of their employers' commercial interests (which may or may not be in line with the overall best interest).

Committee members have also named technical sophistication on the side of user representatives as a major prerequisite for meaningful participation, conveniently ignoring the fact that representing a user in a standards committee does not necessarily require technical expertise, and that there are other important aspects to standards than just purely technical functionality. But they are operating a double standard here; despite the frequently voiced condition that users need to be technically sophisticated, committee members also reported that a proposal's technical merits are significantly less important than, say, the presence of its proponents at meetings (with the exception of the IETF). It might be suspected that technical sophistication is put forward as an excuse to help keep users away from the committees. This would, however, need further data to work from. In any case, though, it would be far more useful to have user strategists and managers on the committees, who are likely to know their respective companies' needs and requirements much better than the average engineer.

Communication is another major obstacle hampering cooperation between vendors and users, as are the different views and perceptions of technology that can be identified between engineers and nontechnical people (especially user managers). Such problems of "cross-profession" communication are not uncommon; solving them requires learning by all sides; engineers need to gain some understanding of the neces-

sary organizational and managerial considerations, and managers need to get an understanding of at least the technological basics.

Despite all these problems, standardization is a major platform for cooperation between vendors and users. If done cleverly, a user company may even have vendors work for them during the process, if it manages to push its requirements into the process — and if it represents a major buying power. This way, a very large company represented in the survey managed to shift (costly) work normally done during the implementation phase of a system into the standards committee. In any case, though, cooperation between the two camps is essential. Without this cooperation the outcome of the standards setting processes would most likely be even less satisfactory.

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BIOGRAPHIES

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