

## Avatars of Participants in Anticipatory Standardization Processes

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### Abstract:

In the development of anticipatory ICT standards, the choice of one technological design over another can provide a clear competitive advantage to the organization that has made the largest investment in the particular design approach. At the same time, if participants are involved only to advance proprietary interests, at the expense of the common good, the standards-setting process fails. Thus, a participant in the process must assume different *avatars*<sup>1</sup>; sometimes to support the common good and sometimes to protect the intellectual property controlled by the organization he/she represents. An analysis of publicly available documents related to the development of web services standards by the World Wide Web Consortium reveals that participants at different times assume the following avatars: advocates, architects, bystanders, critics, facilitators, gurus,

and procrastinators. This understanding emphasizes the relationship between size of organizations and their contribution to the standards-setting process. How these avatars facilitate cooperation or competition determines whether standardization itself acts as a unifier or divider of markets and people. An understanding of these avatars can contribute to effective standards-setting by promoting positive roles and inhibiting negative ones.

### Anticipatory ICT Standards

Anticipatory standards for information and communication technologies (ICT) are standards developed ahead of the technology. Due to the exponential rate at which technology is advancing, ICT standards are becoming more expensive, time-consuming and complex to craft (Weiss and Cargill 1992). Since participants are strongly motivated to bring the technology to market quickly, the standardization process

followed by traditional *de jure* bodies are perceived as being too cumbersome and slow for the purpose of developing ICT standards (Updegrave 1995). As a result, traditional standards setting organizations (SSOs) are now giving way to consortia such as the W3C, SAG, OSF, OMG, OASIS etc. These consortium-based organizations have two components. One component is the technical committees which consist of volunteers representing organizations, users, government, academia, and individuals. The other component is the administrative section which coordinates these groups of volunteers with diverse agendas and goals (Cargill 1989). Participants from industry, on the one hand, find themselves cooperating in the crafting of the standard even as they compete in the marketplace (Kretschmer and Muehlfeld 2004). The roles they perform in this respect are often linked to their relative size and power as competitors in the marketplace. Administrators, on the other hand, aim to ensure that the process is inclusive and at the same time creates a timely solution that will be widely adopted (Cargill 1989).

This chapter contributes to an understanding of the roles played by different participants at different times in the development process of anticipatory standards. Such an understanding is required for examining whether the standardization process serves to unify or divide markets and people.

### **Avatars of Participants**

The human dimension of standards-setting is an important component of the consensus-based process employed by standards consortia. Such a process seeks to reach a compromise among participants who have unique perspectives and agendas. This compromise is achieved through a series of encounters and interactions among participants (Nielsen 1996). Participants meet to discuss and select mutually acceptable solutions from various alternative design options (Economides 1993).

So far, research on standardization has mostly focused on the mechanistic view of standards development as a process of designing a technical artifact (Fomin and Keil 2000). However, humans are not purely rational actors and thus, complex social practices and relationships are embedded in the process. In

order to make the standardization process more efficient and less expensive, we need a better understanding of the various roles that participants play in the process.

The roles played by participants depend on their skills, training, experience and personality (Nielsen 1996). Currently anyone with the time and money to participate in a consortium can be a member. However, this may lead to groups which are not balanced in terms of the skills required to develop a successful standard and do not reflect the needs of those impacted by the standard.

One significant factor that influences the roles participants play is the size of the organization they are representing. Larger organizations have the resources to influence the process by sending more representatives to participate, by hiring people who have gained influence and reputation in standards-setting or by making significant design contributions (Wegberg 2003). Smaller organizations, even when they can afford to be part of the process, may not have the resources or the expertise for the same level of involvement and influence as the larger organizations. Depending on how far

participants from small organizations are inhibited from being part of the process, consortia can be inclusive or exclusive (Weiss and Cargill 1992).

Another factor that determines the roles that participants play is their engagement in the high level activities of design, sense-making, and negotiation. Standardization is a recursive process of designing a technical artifact (design), making sense of others and of the environment (sense-making), and reaching a consensus in spite of conflicting interests (negotiation) (Fomin, Keil, and Lyytinen 2003). Engagement in each of these activities requires participants to play different roles.

We chose to use the metaphor 'avatar' to refer to these roles. An avatar is an embodiment of a role or an idea. Thus, 'avatars' of participants can be considered as the different incarnations that a participant can assume for playing the various roles required during the standardization process.

An examination of these avatars, the roles they represent and how they influence or inhibit the process can help us understand how consortia lead to inclusion and exclusion of

organizations and people in standards-setting. It can also lead to a better understanding of the skills and talents required by the group of participants as a whole to make the consensus-based process more efficient.

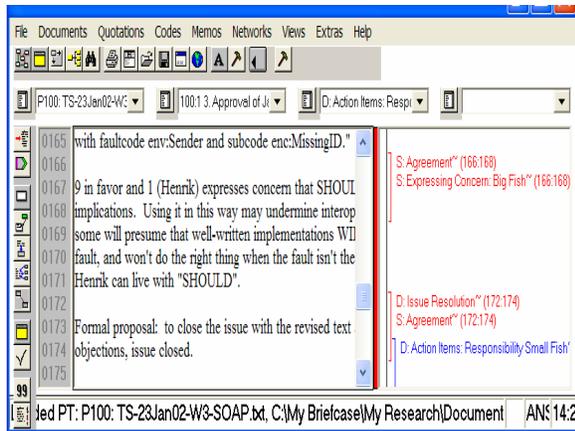
### **A Case Study**

We used the case study approach (Yin 2003) to analyze the standardization of SOAP - Standard Object Access Protocol 1.2 (W3C-XMLWG 2000). SOAP is a part of the core set of standards (along with UDDI and WSDL) for web services. Each of these standards has a substantial design component, and therefore, is a good exemplar of anticipatory ICT standards. The choice of SOAP 1.2 for this study was appropriate because of the high level of design activity as well as the completeness and availability of public archives documenting the development of the standard (W3C-XMLWG 2000).

We performed an empirical analysis of documents related to the standardization of SOAP 1.2 by the World Wide Web Consortium (W3C). These documents, made publicly available on the W3C website, primarily included transcripts of the meetings (either face

to face or via the telephone) (W3C-XMLWG 2000). The results reported in this chapter were obtained from the analysis of 60 documents (in chronological order) out of a total of 120.

We utilized analysis procedures, called content analysis (Krippendorff 2003; Neuendorf 2001), that allowed us to make ‘categorical’ inferences about large volumes of textual data in a systematic and replicable manner (Stemler 2001). The content analysis was performed by a subset of authors, whereas the other authors questioned, examined and ultimately corroborated the interpretations suggested by the first subset. There were two important elements of this analysis of the text: text fragments and codes. A text fragment was usually a text segment related to a significant event or activity performed by participants. A code was the label conveying the meaning attached to the identified text fragment. The analysis was supported by Atlas.Ti, a content analysis software ((ATLAS.ti 2005), see figure 1), which allowed the research team to assign codes to text fragments in the documents.



**Figure 1. An example of content analysis**

To maximize consistency with the interpretation of text, the analysis was initially performed independently by two researchers on the same documents. The results from both researchers were compared to ensure that they had established a common understanding of the specific manner in which text fragments were to be identified, and meanings assigned. From this common understanding, the researchers drew up a set of syntactic and semantic rules which informed further work. These rules ensured that interpretations of texts by the researchers were consistent. After establishing these rules, the two researchers independently coded additional documents.

For the case study, this exploratory and emergent process was used to identify codes. These codes were then categorized into groups

and relations to identify concepts that explain the roles and activities of participants engaged in the standards-setting process.

At least a part of the research team was sensitized to the framework suggested by Fomin and others (Fomin, Keil, and Lyytinen 2003) that characterizes the standards-setting process as one consisting of Design, Sense-making and Negotiation (D-S-N). The activities coded, and the different avatars inferred are, therefore, at least partially influenced by our theoretical biases.

The analysis resulted in several concepts. Examples of concepts that emerged include: action items, cooperation, design suggestions, negotiation etc. We used Atlas.Ti to track text fragments, codes, families of codes, and to find connections among codes. Additional details about the methodology are available elsewhere (Mitra et al. 2005). The results we describe in the next section directly follow from the case study and the empirical analysis described above.

## Results

We inferred a number of interesting ‘avatars’ of participants during the standards-

setting process. Our discovery of these avatars was further aided by access to historical documents (such as proposals, drafts, and recommendations) that made interpretation of certain behaviors easier. For example, we can explain the hectic activity in certain meetings by noting that a W3C draft was published the following week. The discovery was also helped, by our sensitization to the D-S-N theoretical framework described earlier. The different avatars we inferred included:

- Advocate
- Architect
- Bystander
- Critic
- Facilitators
- Guru
- Procrastinator

The Advocate was largely concerned with protecting personal or organizational interests. One activity that this avatar engaged in was campaigning for confining or expanding the boundaries of a standard. Figure 2 shows an excerpt from the transcripts that exemplifies the Advocate avatar<sup>2</sup>.

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*'Advocate' avatar:* My primary goal for ... When we have a spec, we need a way to sell to the community. The ... will be the tool I use for that. We should not put it on the back burner.

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**Figure 2. An example of the Advocate avatar**

The Architect performed activities such as providing and suggesting design options for a component of the standard. We surmise that unlike other avatars, the Architect needed to do considerable work prior to the meeting to be able to suggest design options during the meeting. Figure 3 below shows an excerpt from the transcripts that exemplifies the Architect.

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*'Architect' avatar:* Proposal: delete the box and replace it with ...  
X: The envelope is the frame in which the headers hang, but the envelope is...  
Y: It's a mistake to try to distinguish ... from ...

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**Figure 3. An example of the Architect avatar**

The Bystander could only be discovered by perusing transcripts of several meetings. A participant assuming this avatar would make little direct contribution to the process, preferring instead to merely observe as the standards-setting process unfolded. The only observable contribution from the Bystander, therefore, was his / her participation in the voting process for adoption of alternatives. Clearly, no excerpts can be provided for this avatar, though the analysis did reveal that some participants assume this avatar on occasion.

The Critic was manifested in activities such as issues raised or questions posed for probing

the appropriateness or comprehensiveness of design proposals. Clearly, participants with significant insight into the standard under development (such as those who assumed the Architect avatar for another component of the standard) could assume this avatar. Figure 4 shows an excerpt that exemplifies this avatar.

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*'Critic' avatar* raised issue of an xml file server which may not want to take responsibility for normalizing data it has received. Issue was raised that this happened because xml was used for the envelope - suggestion was made to not use the word header ...

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**Figure 4. An example of the Critic avatar**

The Facilitator performed activities such as regulating discussion, editing specification documents, and/or providing relevant information for discussion. Participants who often assumed this avatar were representatives of the SDO (e.g. W3C) or the Chair of the standards development working group, or an editor of the standard specification document. Figure 5 shows sample excerpt from the transcripts for the Facilitator.

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*Facilitator avatar:* So there is a separate decision to be made about whether we need correlation ids and how and if we use our extensibility mechanism....  
X: Let's take this to e-mail.

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**Figure 5. An example of the Facilitator avatar**

The Guru performed activities such as approving and/or rejecting design based on its technical merits. The activities this avatar performs, thus, require skills similar to those required of a Technical Evangelist in an organization. The insights provided by this avatar often stem from knowledge that transcends the specific standard being considered. This avatar is, therefore, crucial during anticipatory standardization processes. Figure 6 shows an excerpt that captures an intervention from the Guru.

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X: The envelope is the frame in which the headers hang, but the envelope is...  
*'Guru' avatar:* It's a mistake to try to distinguish ... from ...

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**Figure 6. An example of the Guru avatar**

The Procrastinator deliberately delayed the process either by introducing unwarranted concerns or by being absent or uninvolved in a discussion where he/she was expected to contribute. Instances of the first can be difficult to identify, and may be similar to a filibuster strategy employed in some political settings. It is hard to say whether participants were simply being over-cautious or whether they had political reasons for delaying the process<sup>3</sup>.

Figure 7 shows an excerpt that describes the Procrastinator avatar.

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Chair: Postpone this agenda item due to X's (*Procrastinator avatar*) absence.

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**Figure 7. An example of the procrastinator avatar**

Our conceptualizations of avatars described above are influenced by the activities in the D-S-N theoretical framework (Fomin, Keil, and Lyytinen 2003). For example, the Architect, Critic, and Guru are largely characterized by their participation in the Design (D) activity. The Advocate and Critic may be seen as engaging in Sense-making (S). And the Facilitator, Advocate, Bystander and Procrastinator may be interpreted as implementing different Negotiation (N) strategies. As the D-S-N framework suggests, an avatar may simultaneously engage in multiple activities. For instance, the Critic may engage in design as well as sense-making and the Advocate protects their interests, thus, when both interact, they perform negotiation activities (N). The avatars, thus, also suggest an avenue

for further elaboration of the D-S-N framework. For instance, interactions among avatars can describe cycles of D-S-N activities. In the next section, we speculate about how these results can help us understand anticipatory standardization processes better.

### **Analysis**

The avatars described above indicate that rudimentary characterizations of roles, such as small versus large firms, may be insufficient to understand the varieties of roles played by participants in ICT standardization. The avatars we have suggested, along with the assertion that participants may assume multiple avatars, provide a richer view of how they participate in ICT standardization processes. To further understand how the participants take on different avatars, the data was analyzed by superimposing avatars on the simpler characterization of small versus large firms. Table 1 below shows the results of this analysis, which captures the number of instances, where smaller versus larger firms assumed each avatar.

**Table 1. The use of Avatars by Participants from Large versus Small firms**

Avatar	Assumed by	Possible interpretations
Architect	Participants from Large firms were nine times more likely to assume this avatar than those from Small firms	Indicative of resources at the disposal of large firms
Guru	Participants from Large firms were six times more likely to assume this avatar than those from Small firms	Indicative of the ability of large firms to <i>sometimes</i> woo and afford good talent
Critic	Participants from Large firms were only four times more likely to assume this avatar than those from Small firms	Indicative of the <i>relative</i> ease with which this role may be assumed
Procrastinator	Few instances of procrastination, with about equal number of instances for participants from Small and Large firms	Indication of non-use of this negotiation strategy by firms, Large or Small
Advocate	Participants from Large firms were twenty-seven times more likely to assume this avatar than those from Small firms	Indicative of the influence of Large firms, Small firms cannot effectively advocate an agenda
Facilitator	Often assumed by the chair of the process and W3C representative	Indicative of the influence of the chair and SSO representative
Bystander	Difficult to characterize in terms of number of instances because it captures sequences of passive behaviors	Not possible

The table above shows that the standardization process proceeds as anticipated with little procrastination. It shows the significant influence that large firms can exert on the standardization process, and offers possible explanations for this. Additional analyses were performed to understand how the avatars interact with one another. Complete results for this analysis cannot be shown here due to space restrictions. Instead, the examples given, demonstrate the power of the metaphor of avatar we have used during the analyses. First, we observed interactions between the roles

Architect and Critic, with the former proposing designs, and the latter commenting on the proposals. These interactions, where both avatars were assumed by participants from large firms, often resulted in significant changes to the standard. Second, an amplification of this was observed in the cycle of interactions between the avatars Critic, Facilitator and Architect. Following an issue raised by a Critic (often a Large firm), the Facilitator (chair of the process) assigned the issue to be investigated by an Architect (the same or another Large firm). Both patterns demonstrate that the Design activity

(the 'D' in the D-S-N framework) may become heavily influenced by large firms in this manner. Additional analyses can be performed to characterize Sense-making (S) and Negotiation (N) cycles as interactions among different avatars.

The analysis above also suggests possible strategies that small firms may use to participate more effectively in the standardization process. For example, hiring Technical Evangelists, who may assume the Guru avatar during the standardization process may be a possible approach to effective participation in the standardization process. It may be possible for participants from small firms to assume the avatars of Critic more often even with the limited resources available at their disposal. Further speculative analyses are possible extending the interpretations suggested by the empirical analysis.

A final word of caution is necessary. The empirical analysis we have reported, and the interpretations we have suggested rely on the assumption that the public documents reveal faithful accounts of the standardization process. Like other social processes, the standardization

process may also include elements that are not amenable to an archaeological analysis such as ours. Subject to this caveat, the metaphor of avatar and subsequent analyses we have shown present a useful tool to improve our understanding of anticipatory standardization processes.

## **Conclusion**

Though a number of studies have examined the process and technical merits of standards-setting, few have looked at the social-psychological factors involved (Nielsen 1996). The avatars described in this chapter provide a richer understanding of the different roles played by participants in the development process of anticipatory standards. An understanding of these avatars will help SSOs manage the standards-setting process to make it more efficient. Organizations can use these avatars to recruit, retain and train personnel, who can effectively participate in the process. Together, these two can lead to making the process more open and inclusive.

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## Notes

<sup>1</sup> An avatar is an embodiment of a role or an idea.

<sup>2</sup> In this figure, and the others that follow, the names have been disguised, and the text has been intentionally altered to protect the identity of the participants.

<sup>3</sup> Attributing intentionality to the (pattern of) absence of a participant from the development process was a choice made by the researchers.

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## Biographies

**Karthikeyan Umamathy** is a Ph.D. student of Information Sciences and Technology at the Pennsylvania State University. His research interests are service-oriented computing, web services, enterprise integration, business process management and multi-agent systems. His research is published in various IS conferences and journals.

**Sharoda A. Paul** is a PhD student at the College of Information Sciences and Technology at the Pennsylvania State University. She has a BEngg. in Computer Science and her research interests are in large-scale information systems implementation and risks in systems integration, specifically in the domain of ERP systems and medical information systems.

**Sandeep Purao** is an Associate Professor of Information Sciences and Technology. He holds a Ph.D. in management information systems from the University of Wisconsin-Milwaukee. His research focuses on various aspects of information system design and development. His current research projects include integrating workflow patterns into design, reuse-based design, flexible information system design, empirical investigations of individual design behaviors, and design theory. He has worked on projects dealing with object distribution design strategies, measurement for object-oriented design, document management and abstractions for system development knowledge. He continues to be interested in pedagogical issues for information system developers.

**John W. Bagby** is Professor of Information Sciences and Technology and Co-Director of the Institute for Information Policy. He has a B.A. in political science and philosophy, an M.B.A. (finance) and a J.D. (law). His practice experience includes clerkships for a multinational oil company and a Wall Street law firm in matters of legislation, energy law, antitrust, securities regulation, corporate and commercial law. Professor Bagby's has taught courses in the law of information technology, eCommerce and intellectual property at several major public universities. His research is published in various law reviews, business and economics journals and research monographs. Interdisciplinary and sponsored research has addressed tort reform, tort data management, technology transfer, information science and intelligent transportation systems. Professor Bagby is co-author of numerous college texts including the Cyberlaw Handbook for E-Commerce and The Legal and Regulatory Environment of e-Business: Law for the Converging Economy.

**Prasenjit Mitra** received his Ph.D. from Stanford University in Sep., 2004. His dissertation involved building a framework for ontology composition. His current research interests are in the fields of web services and ontologies. He is currently funded by a grant from the e-business Research Center for his investigation on "Discovering Web Services". Dr. Mitra has been the advisor for two Ph.D.

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