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【Invited】

Customer-Focused Standards Development

MobiLife, OASIS, W3C, IETF, OMA, and OMTP

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1. Introduction

User needs based product development has come to the fore in the last few years. In Scandinavian countries, user involvement in the development process has always been a large part of the development process, but it is only lately that studies supporting this model as a commercially viable (and, indeed, commercially superior) model has emerged [vHIP].

User typically have differing sets of requirements, which overlap to larger or smaller degrees. If the requirement sets overlap, the user can buy the products which are produced according to those specifications, since this is more economical than developing for the individual user; but if the requirements are unique, it may be more appropriate – if not more economical – to develop a unique system. However, this may not be economical (since the cost for development is higher than the amount of money that the user wants to invest).

Standards can be a useful component in the development of specifications of user requirements, since the user typically specifies systems based on components and their adaptions (according to Eric von Hippel). Since standards documents provide a rigorous description of a component, they can be useful in creating a specification which is meaningful for developers, as well as for the user, since the description is formal and – standardized.

In this paper, I will investigate the role of user requirements in a user-centric development process, and also look at how requirements are taken into account in different standardization bodies, which determines how well adapted the standard is to the market requirements – and hence how well it will be used.

2 . User innovation and User Needs

Recent research has clarified what has been known for a long time in the Swedish ITC industry: That user involvement in development leads to the development of new services, and to higher productivity in service development. However, this does not take place as traditionally envisioned.

In his recent book [vHIP], Eric von Hippel of MIT makes the case for development being driven by user needs – and since nobody can know the needs of users as well as the users themselves, he also points to the fact that end-user innovation is behind the majority of new products which do well in the marketplace. This alone should be enough to make manufacturers stop and think, but he also points to two other very relevant facts: That there are clusters of user needs, and some clusters may overlap others, but that they may not overlap totally ("a few sizes fit all"); and that there are tradeoffs between buying and developing yourself. Apart from being recognized for technical savvy (something that is as good an explanation as any of the success of the Open Source movement), an end-user may determine that the cost of developing his own solution may be too expensive compared to the one provided by a manufacturer – indeed, a standardized solution.

3 . User Needs input to Standards Bodies

In a commercial context, requirements gathering is a part of product development. User requirements is typically one among a set of requirements gathered during the development process (other requirements may, for instance, depend on legacy system integration). Gathering requirements and determining compliance towards them is an important part of any product development process in a reasonably mature industry, where the product is intended to have an impact.

Standards development is different from product development in many important respects, but one of the most important is that the development process is anchored in a community of stakeholders. This means that in the product development case, the stakeholder community being addressed is the customers; in the standardization case, the stakeholder community is the group for which the standard is developed, i.e. the community participating in the development. If that community has a process to develop requirements which are grounded not among its own members, but the recipients of the specification, this can be expressed in a requirements document (as it is typically done in product development).

Since requirements can diverge, but standards are intended to express industry consensus, this may lead to standards which contain a large number of options. To capture the requirements, the process will have to downselect the options.

4 . Requirements and Requirements Gathering

In the IETF Internet Standards Process, the requirements collected are technical requirements for how a standard should be applied [RFC2026]. The process does

not contain any notion of user requirements (or, indeed, users).

OASIS is an old standards body (founded in 1993), initially set up to create standardized SGML documents, but now creating standards for XML and uses of structured document formats. It has a well developed technical document creation process – but this does not involve requirements gathering [OASIS].

The W3C, another group working on standards development, does not have a requirement on requirements documents either [W3CP]. Nevertheless, most W3C groups create a requirements document before developing a specification. However, since this is not required, the requirements can differ quite a bit, and there is no process to verify how the requirements have been fulfilled.

Another standards body, recently formed, was intended to capture the interests of a stakeholder group. The Open Mobile Terminal Platform (OMTP) was set up in 2004 to assist differentiation among operators (who provide services to end-users), while complying to standards. Only operators can be members. The organization has not published a formal process, so it is not known if it will provide requirements documents or not. The group will provide recommendations based on existing standards, i.e. not develop its own standards, nor provide only requirements [OMTP].

The Open Mobile Alliance is the only one of the investigated standardization bodies which has a formal requirements gathering process [OMAR].

5 . OMA Requirements Handling

The Open Mobile Alliance has a process for handling requirements beyond the requirements gathering process, which is also different from other standards bodies surveyed [OMAR].

The OMA process starts when a work item is approved. The work item is then handed to the OMA Requirements Group for the production of a requirements document for this work item. The resulting requirements document is handed over to a technical working group, which undertakes the development of the actual specifications.

This development starts with the creation of an architecture document, and this is reviewed against the requirements document. When the specification process is finished, a verification test for interoperability is specified; this is also based on the requirements. It is not until the specification has been shown to have interoperable implementations according to this test procedure that it can actually receive the stamp of approval.

This means that there are several hurdles which the development process has to pass, where requirements are leveraged. This is also different from other standards bodies, which at most require that two independently developed implementations can interoperate (something very different from being tested against an interoperability specification!).

6 . User Needs Analysis: Using Scenarios.

Developing mobile applications which succeed in the market place is currently a hit-or-miss process. While there are ways to determine whether an application is adapted to the needs and wants of a specific user group, there is no way to determine if the services will be successful in the marketplace. However, as we have seen, capturing requirements which express the user needs is crucial to this success.

One way of capturing user needs without actual development, which has been demonstrated in the ITU IMT-2000 work (among others) is the use of scenarios [ITU].

To address the challenges in user-centric services, the MobiLife project focuses on developing support comprising personalization, context awareness, user interface adaptation, privacy, and trust [ML].

In order to tailor the performance of the user's applications and services to his or her situation, there must be some way for the technologies surrounding the user to know what that

situation is [LSJH]. Is the user inside or outside? Walking, driving, or standing still? At home or at work or school? Certain features of the user's situation, such as his or her location, can

be gathered without the use of sensors (for example, by using the user's cell-of-origin to approximate his or her physical location). To detect other information about the user, it is possible to use various kinds of sensors [SCHMIDT].

The additional information that can be gathered about the user is often of quite sensitive nature, if applied in the wrong situation. Scenarios for this abound [WF], but while there have

been attempts to determine what the threats are, the situations where this would be useful to the user are not as frequent in the literature, usually occurring in scenarios which ultimately are intended to sell the system (see e.g. WWRF [WWRF]).

MobiLife's general approach is to integrate different perspectives, such as user-centred views, business and marketing views, and technology development views. In order to give increasing definition to the concepts being designed, the project description lays out a phased, iterative approach, in which demonstrations and prototypes of increasing levels of fidelity are developed [vLH].

MobiLife's iterative approach consists of several cycles of user research, technical design and development, and user evaluation. The first step of this process is the creation of scenarios, followed by the creation of mock-ups and probes. At each step of the process, some kind of user evaluation should be conducted to help identify the most promising concepts from the users' point of view and to gather detailed user requirements for these concepts.

The MobiLife project is divided into nine work packages, some of which do not pertain to the discussion here. Those that do are the work package 1, which is focused on user experience; and work packages 2 to 5, who are concerned with various technical aspects of the project. The interaction between the user experience, the end-user applications, and the architecture in which these applications are performed, is the main investigative focus of the project.

The MobiLife scenarios were developed based on an analysis of the user tasks and behaviours found in an extensive review of scenarios from other projects and from within the MobiLife

technical work packages. A collaborative scenario development workshop was then conducted with representatives from most of the MobiLife work packages [AFTELAK].

These scenarios formed the basis for qualitative user research with families. 17 families (10 in Italy and 7 in Finland) were interviewed in their homes, first about their general communications behaviour and then specifically about the tasks and behaviours shown in storyboards of the scenarios. Two to three scenarios were reviewed in each family interview [AFTELAK].

The scenarios were used as the basis for interviews with 17 families in their homes. Because the user research was conducted with family members, our findings pertain to the core family members rather than to all of the reference groups for the families.

In general, commercial services were seen as useful for specific tasks such as buying books, CDs, or movie tickets. However, some users doubted whether the services would ever be integrated enough so that the most unpleasant parts of consuming, such as queuing, could be avoided.

Intelligent and adaptive systems face the dilemma that the more appropriate inferences they make about users' wants and needs, the more out of control users will feel. Users want to

make decisions themselves. The same concern was raised for another of the applications

described in the scenarios, the "multimedia sharing" application, which intends to create something akin to "blogs", but with a real-time component. Some participants noticed that there could be a problem of privacy, especially when another person registers and broadcasts an event in which they are involved. Therefore they asked for an important privacy control. A typical quotation was: "I wouldn't like to know that someone is watching me on a TV, it seems like 'Big Brother'..." (a popular television show, where participants are monitored 24 hours per day, and the coverage broadcast, often to viewers mobile phones).

7 . Conclusion

Using scenarios to create services, and using a structured process in doing so, has already helped us to derive valuable research results and create mockups for services which can be

user tested. The use of scenarios is a simple mechanism to select appropriate services for development (and de-select inappropriate services) when combined with a user evaluation.

Since the intent is to develop services which are more appropriate for users than the traditional "hit and miss" method, and since the mockups will be tested on users and reveal any additional misconceptions about the service (through the analysis of the user interactions). Selecting the appropriate services through scenarios also facilitate both user testing and visualization further down the road, as the service developers can refer back to the scenario

evaluation and get user feedback on the intentions of their services.

This analysis will have an impact of the architecture of the underlying system, since the functions needed to deliver the services will be described in a way that highlights the commonalities between the services, and the functional constraints on them.

This implies that the same method could be used for creating services which are based value created for the users, and – provided that the method is used to create requirements – be used to create requirements for the development of standards.

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